# RCA Victor
# SERVICE NOTES
for
1933

Broadcast Radio Receivers
All-Wave Radio Receivers
Phonograph Combination Instruments
Miscellaneous Service Information

Service Division
RCA Victor Company, Inc.
Camden, N. J., U. S. A.

RCA Victor

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INTRODUCTION

The Instruction Books and Service Notes contained herein are for the radio receiver and phonograph combination models sold by the RCA Victor Co., Inc., during the year 1933. This information has been compiled for RCA Victor Distributors and Dealers for use by their personnel in conjunction with the servicing and replacing of parts in the instruments listed.

Proper operation of any radio receiver is dependent upon correct service methods and replacement of defective parts. We earnestly recommend that you follow the instructions given, use the equipment recommended and replace defective parts with genuine RCA Victor Factory Tested Replacement Parts. Your Distributor will be glad to obtain any part or service equipment mentioned in this book and give you any possible assistance in the performance of your work.

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FACTORY-TESTED RCA PARTS

LET THEM HELP YOU BUILD A PROFITABLE SERVICE BUSINESS

"As a Quality Business, Radio Service Will Become a Profitable Business" *

THE most valuable asset any radio service business can have is the confidence of its customers. As in any professional service business, there are three factors in radio service work which go to create customer confidence: the ability of the radio service engineer, the business methods employed, and the parts or merchandise used.

The most tangible of these three factors is the parts used. Months must elapse after a service job is done before your customer can be sure of your ability; repeated contacts are necessary before your customer is aware of your business methods; but today he can appreciate the fact that you used the highest quality, factory-tested parts when you serviced his radio receiver.

And that mere fact alone—that you used factory-tested parts of a well-known brand—reassures him that you are competent and that your business methods are of the same high quality as the parts you used. Because you have used quality parts, your customer is confident he is getting a quality job and is satisfied to pay a quality price.

What makes for quality in radio parts?

First, consider the manufacturers: their reputation, their position in the radio industry, their research and laboratory facilities, their manufacturing facilities, their reputation for quality and fair dealing. Consider all of these points when you buy replacement parts and you have your best reason for insisting on factory-tested RCA Parts.

Through every step from the research in the laboratory to the packaging, RCA Parts are designed to be worthy of the greatest name in radio, RCA. Every radio replacement part manufactured by RCA Victor Company, Inc., owes its quality primarily to RCA's unmatched laboratory and engineering facilities, and secondly to a factory organization that for thirty years has produced only quality merchandise.

Let us take an RCA power transformer, for instance. It was designed to do a specific job by engineers who are specialists in power transformers, who have concentrated their efforts for years on this one type of equipment. They have had the invaluable advantage of the collaboration of other specialists in all divisions of radio engineering.

Every normal requirement of the power transformer's particular function is first calculated. Tentative specifications providing generous safety margins are drawn up. From these specifications sample lots are

The oscillograph gives Paul Whiteman a "picture" of his music

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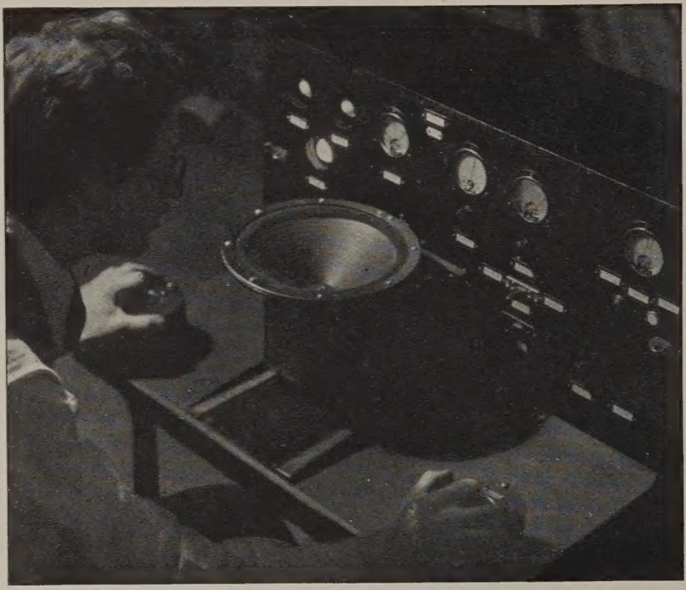
*Excerpt from an editorial, RCA Radio Service News, April 20, 1934, by E. M. Hartley, Manager, RCA Parts Division.

Drawing I. F. curves by means of specially developed equipment

manufactured and the product is tested in actual use. Changes in specifications may be necessary before the Engineering Department permits the transformer to go into regular production. However, when design specifications are adopted for a part, and a stock number assigned to it, thereafter every part sold under that number must conform to specifications as to essential electrical characteristics. RCA Replacement Parts do not vary from one factory lot to another. You are assured of uniformity between lots as well as between individual pieces.



Each speaker gets a high voltage breakdown and impedance test

In the Manufacturing Department, the quality of RCA Parts starts with the specifications and rigid tests for raw materials, and continues through the manufacturing processes. In power transformers, for example, the multiple winding system is used to avoid strain and to permit of tests of individual coils before assembling. An exclusive vacuum asphalt process of impregnation gives complete penetration of laminations as well as of coils. The result is a product that is impervious to moisture and which has an extremely low hum or rattle factor. RCA power transformers, as all RCA Parts, are built up to laboratory standards of quality rather than down to meet a price and yet they cost no more than "just-as-good" parts.

"Factory-tested" is more than a slogan. It means that every RCA Part is tested individually many times between steps in production. It means that every RCA Part is tested as a finished product. It means that sample lots of parts are tested before shipment. Most of all, it means that the transformer you buy, or any part you buy, is not just another transformer, but is factory-tested for the particular job it was designed for. It means that you get quality in the fullest sense of the word.

But why buy quality factory-tested RCA Parts from an authorized RCA Parts distributor when apparently the same part or an almost-as-good part can be obtained from, for instance, a salvage house? The reason is —salvage. Who can afford to entrust his reputation and good will to replacement parts that were salvaged out of old sets or

The continuity test—one of many tests along the production line

H.O.T.

The first step toward quality—testing raw materials

Where test instruments are tested—the Standards Laboratory

Test data is carefully noted and studied

that were rejected by the factory as not up to quality standards? Who can afford to make the call-backs necessitated by the failure of salvaged or "just-as-good" parts?

Parts for radio receivers can be made cheaply as so many turns of wire and so many pieces of iron, or they can be built with the precision of laboratory apparatus. When parts are scientifically designed to perform a certain function, built with precision to the most exact standards from only the finest raw materials, and then tested time and time again during the process of manufacture, they naturally cost more to produce than parts whose outstanding feature is their price.

Similarly, merchandise that is produced to meet a demand, and sold only through legitimate channels of distribution, must cost more than merchandise that has been dumped on the market or salvaged from what sources nobody knows. If such merchandise has any place in the radio-service industry it is in that part that does poor work, with poor parts, and can charge only starvation prices.

For a profitable radio-service business, conducted by real radio-service sales engineers, the best quality parts are the soundest investment that can be made. They save time and money, and, in the long run, they save the customer's good will. Their cost is only a small part of profitable radio-service prices.

RCA Parts, purchased from an authorized RCA Parts distributor, are the only RCA Parts which you can be sure were factory-tested. They are guaranteed by the manufacturer and by the distributor—and the distributor stands ready at all times to make good the factory guarantee.

RCA Parts give your service work the prestige of the greatest name in radio. They give you the assurance that the customer will accept them without question.

RCA Parts are quality parts, for quality work, entitling you to charge quality prices. They are worth the difference.

Use factory-tested RCA Parts—and let your customers know that you use them.

FOR PROFITABLE SERVICE WORK

FACTORY-TESTED RCA PARTS

Important Considerations for All-Wave Reception

Energy is radiated from an antenna in various directions, depending on the shape and size of the antenna and its length as compared to the wave length of the frequency being broadcast. The energy radiated horizontally gives rise to what is called the "ground wave." The energy which is radiated upward gives rise to what is called the "sky wave." At long wave lengths the ground wave follows the curvature of the surface of the earth and radiates along the earth's surface until its energy is completely absorbed by the earth, building, trees, mineral deposits, atmosphere, etc., in which it induces voltages. At very short wave lengths below 10 meters the ground wave does not follow the curvature of the earth but radiates at a tangent to the earth's surface like a beam of light and very little energy can be found beyond the horizon as seen from the antenna. Intermediate frequencies follow an intermediate course. Therefore, the ground wave will extend outward from a long-wave broadcasting station much farther than from a short-wave station. The distance from the antenna that a ground wave can reasonably be expected to be detected is given below:

FREQUENCY (K. C.)	WAVE LENGTHS IN METERS	GROUND-WAVE RANGE IN MILES
100	3000	1000–500
1000	300	175
3000	100	90
6100	49	75
9400	31	60
12000	25	50
15600	19	35
18000	16	15

This data together with that which follows has been collated from the best available sources and represents conditions as generally and dependably found. Many variations occur, some of which differ so much from our accepted ideas as to warrant their being called freakish. These variations make it extremely difficult to establish definite laws. However, if you will treat the data given as a general guide rather than a hard-and-fast rule you will find it very valuable.

The sky wave is considered to continue upward until it strikes an ionized layer (called the Kennelly-Heaviside layer), where it is partially reflected.

Up to a frequency of about 3500 KC (86 M) the reflected sky wave overlaps the ground wave near the station and extends outward a distance which depends on the frequency and the condition of the atmosphere. For these frequencies (below 3500 KC) distances up to 2000 miles can be reliably covered during winter nights. In this range of frequencies 1500 KC has the least effective range. Refer to the following illustration:

Above 3500 KC the sky wave returns to the earth so as to cover a band which surrounds the transmitter but does not extend close enough to it to overlap the ground wave. Because of this, a dead spot (Sky's Distance) lies between the point at which the ground wave ends and the sky wave starts. The distance from the station to the point at which the sky wave starts increases very rapidly as the frequency increases so that beyond 14 meters (21,400 KC) almost no sky wave reception is possible either winter or summer (or day or night).

Below 3500 KC (where there is little or no sky's distance), the daylight range of a station is very much less (from 15 to 40 per cent) than its range when the path is wholly in darkness. For frequencies slightly above 3500 KC (86 M) the sky wave during daylight hours covers a fairly narrow band of the earth's surface. As darkness covers more and more of the path the whole band moves outward and at the same time broadens, thus increasing the "Sky's Distance," and very greatly increasing the maximum range. For relatively high frequencies (above 16,000 KC) the sky wave, when in darkness, returns to the earth such a great distance from the transmitter as to be of little value for reception. For daylight along the entire path, this condition occurs above 20,000 KC (15 M).

Conditions differ radically between winter and summer. For low frequencies (below 3500 KC) the range is greatly decreased in summer. For the higher frequencies the band in which the sky wave returns to the earth's surface is much nearer the transmitter in summer than in winter and the width of the band is much narrower. This gives rise to shorter "sky's distances" and lowers the maximum range during summer. This makes for better reception at certain wave lengths and poorer reception at other wave lengths. This effect will be discussed in reference to each of the broadcast bands in a few minutes.

Broadcast channels are usually established by an International Radio Congress. Channels of limited carrying power are usually established and allotted by a Federal Radio Commission. The following Broadcast channels have been established:

NAME	KC RANGE	METERS
	EUROPEAN LONG WAVE	
Assigned	150– 265	2000–1138
Used	150– 440	2000– 682
	MEDIUM WAVE	
Assigned	550– 1500	545– 200
Used	500– 1500	600– 200
49 Meters	6000– 6140	50–48.86
31 "	9500– 9600	31.58–31.25
25 "	11700–11900	25.64–23.21
19 "	15100–15350	19.87–19.54
16 "	17750–17800	16.90–16.85
13 "	21450–21550	13.98–13.92
11 "	26500–26600	11.68–11.28

1. European Long-Wave Band. This was assigned to cover 150–265 KC, but was expanded to include 150 to 440 KC largely by the action of Russian stations, and this has since been officially approved.

2. Medium-Wave Band. This band has an assigned frequency of 550–1500 KC and is used chiefly in the United States. European and a few other stations are using frequencies from 520–550 KC as well.

3. Forty-nine Meter Band which extends from 6000 KC (50.0 M) to 6140 KC (48.86 M).

4. Thirty-one Meter Band extending from 9500 to 9600 KC (31.58–31.25 M).

5. Twenty-five Meter Band including 11,700 KC (25.64 M) to 11,900 KC (23.21 M).

6. Nineteen Meter Band including 15,100–15,350 KC (19.87–19.54 M).

7. Sixteen Meter Band including 17,750–17,800 KC (16.90–16.85 M).

8. Thirteen Meter Band including 21,450–21,550 KC (13.98–13.92 M).

9. Eleven Meter Band including 26,500–26,600 KC (11.68–11.28 M).

The Long and Medium Broadcasting Wave Bands serve well a limited area surrounding the transmitter. This area is greatly limited in the daytime, however, so that many sections of the United States have very little in the way of broadcast entertainment until late in the evening.

Even then these sections may have to rely on one or two transmitters carrying entertainment of doubtful value. The shorter wave lengths make more nearly possible a greater selection of programs, entertainment at any time of the day, direct (not relayed) reports on events of importance, entertainment in one's native language and offer the thrill of DX reception.

Referring to the chart, we see that the 49 meter band offers good distant reception at night and in the evening when part of the path is in darkness. It contains more transmitters which broadcast regularly and reliably than any of the other short-wave bands and should be the most satisfactory for evening or night distant reception. This band will also be useful in daylight reception from stations about 300 miles distant.

The 31 meter band has fewer broadcast stations which are reliable and regular in operation. It will be useful in daylight reception of transmitters about 800 miles distant and on more distant stations, after dark especially during the summer months.

The 25 meter band has about the same number of broadcasters as the 31 meter band. It is especially useful for reception from stations 1000 miles distant during daylight hours, and in Camden has been found to be next to the 49 meter band in usefulness. Night reception from stations 3000 miles distant is possible during summer months.

The 19 meter band is fourth in the number of stations transmitting regularly and fourth in usefulness (in Camden). Stations 1500 miles, or more, away can be received under favorable conditions during daylight hours. Rarely can stations be heard on this band when any appreciable part of the path is in darkness.

The 16 meter band is used by but few transmitters and is useful for daylight reception from stations 2500 miles and more distant and rarely at night.

The 13 meter band is also used by but few transmitters. On the chart we have indicated the reception possible at 14 meters and at 13.7 meters (on each side of the 13 meter band) to illustrate the fact that this band is on the very edge of the range useful for daylight reception and affords no night reception except within the range of the ground wave (15 M). Its only present usefulness is experimental.

The newly assigned 11 meter band is occupied by but one or two experimental stations and has, like the 13 meter band, no present usefulness.

In computing the distance from the various transmitters to your home town, it is necessary to follow a great circle course. The following approximate figures were measured on a globe map of the world. Measurements cannot be taken from a flat map with any degree of accuracy.

FROM	TO	DISTANCE
New York	California	2,500 miles
" "	Central America	2,000 "
" "	Buenos Aires	5,500 "
" "	Mexico City	2,000 "
" "	Winnipeg	1,500 "
" "	Dallas, Texas	1,500 "
" "	Denver, Colo.	1,500 "
" "	Berlin	4,000 "
" "	Melbourne	10,000 "
" "	St. Louis	1,000 "
" "	Jacksonville, Fla.	1,000 "
" "	South Africa	8,000 "
" "	Moscow	5,000 "
California	Berlin	6,000 "

Nature in its thunder and lightning storms produces very little disturbance in these shorter wave bands. However, man-made interference, for example, power line noises, automobile ignition noises, commutators' sparkings, etc., appear to contain a larger component of short-wave disturbances than exists in medium-wave broadcasting.

Another disturbing factor in short-wave reception is fading, which becomes worse as the frequency goes up. Fading is of two types—intensity fading with no change in quality and selective fading in which the energy level is but little changed but the signal is badly distorted through cancellation (or re-enforcement) of certain frequencies. Excellent automatic volume control action is necessary, but even then selective fading occurs which makes the sound go "mushy." The actual extent of the fading does not differ greatly from that of medium waves but occurs much more often and with greater rapidity of change. Selective fading is caused by energy coming to the receiving antenna over paths of different lengths. This makes some of the energy lag the balance by an exceedingly short time. Obviously the same time lag will cause a greater phase difference on a high frequency band than on a low.

Another problem arises in the high frequency band. Some short-wave stations operate at a comparatively low percentage of modulation because this results in a reduction of distortion while fading is taking place. This means that a carrier of given strength may contain a smaller audio signal than on the long waves. This must be considered in the design of a short-wave receiver to avoid overloading the radio stages in order to get sufficient audio output.

As a rule the field strength upon which we depend for our short-wave reception is smaller than that upon which we depend for our good long-wave reception. This means a large amount of gain must be used with the consequent increase in noise to signal ratio. This presents a very important problem which has to be met in the receiver design.

In order to cover long and short waves in the same instrument, it is possible to build the instrument to fit one point of the range to be covered and accommodate it to the various other bands by modifications of various kinds. In doing this, compromises must be made in one range or another. This presents a very important problem to manufacturers building quality merchandise since others following the cheaper, and less satisfactory method, may be able to produce a set at a lower cost.

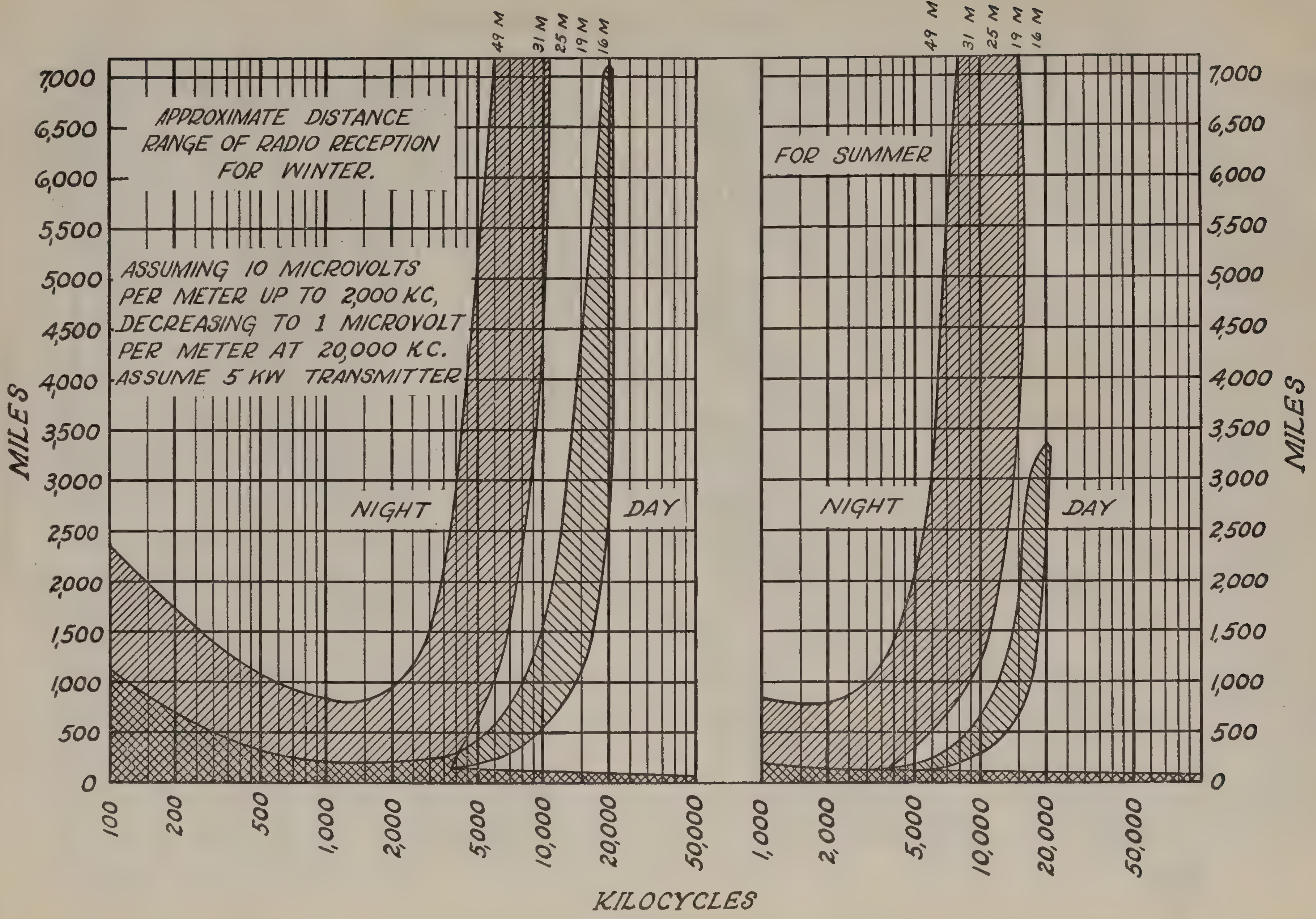
Another factor in the design of an all-wave receiver is of great importance. Harmonics of long-wave stations, of phone and code transmission may produce annoying disturbances unless great care is taken to reduce them to a minimum. Check this factor when comparing two different all-wave receivers.

Before explaining how these difficulties have been met by our engineers, it might be well to say a word or two about antennas for all-wave sets. The length of the antenna is of secondary importance. The first consideration is that the antenna be so located as to pick up a minimum of noise from automobiles, oil burners, power lines, etc. Keep the antenna and lead-in as far as possible from such sources of interference. It may be feasible to put a condenser across motors producing noise. Other methods of noise prevention will present themselves to you. Shielded lead-in or transformers in the antenna circuit may cause serious attenuation of signal on the shorter wave bands, and they should not be used unless definite improvement is demonstrated.

Within the past year a great improvement has occurred in short-wave broadcasting. The present political situation throughout the world has been partially responsible for this increased activity and propaganda is being broadcast frequently from U. S. S. R. and Germany. The power of a number of important stations has been increased and a number of new stations have been put into operation. Notable among these are the British Empire stations established, one in each band, to keep the entire Empire in touch with London. The number of hours of operation have been increased and more definite schedules are maintained.

All this has greatly increased the value of short-wave reception and explains why we feel that a receiver of excellent quality to cover the short-wave bands is now warranted.

RECEPTION CHART



The chart shown gives a graphic indication of the distances, frequencies, time of day and season of the year for best or possible reception at transmitting frequencies from 100 KC to 50,000 KC for winter and 1,000 KC to 50,000 KC in summer. It should be noted that the bands shown are centered for the middle of each period. For example, the center of the day band represents noon, for reception between north and south locations and 9 or 10 AM Eastern Standard Time for reception of European stations in the eastern United States. Noon and mid-night are figured on the basis of the position of the sun in respect to both transmitter and receiver.

These bands move and contract or expand as time progresses. From mid-night to noon the wide night band moves in the direction of and contracts to, the size of the mid-day band. From mid-day to mid-night, the day band expands and moves in the direction and to the width of the night band.

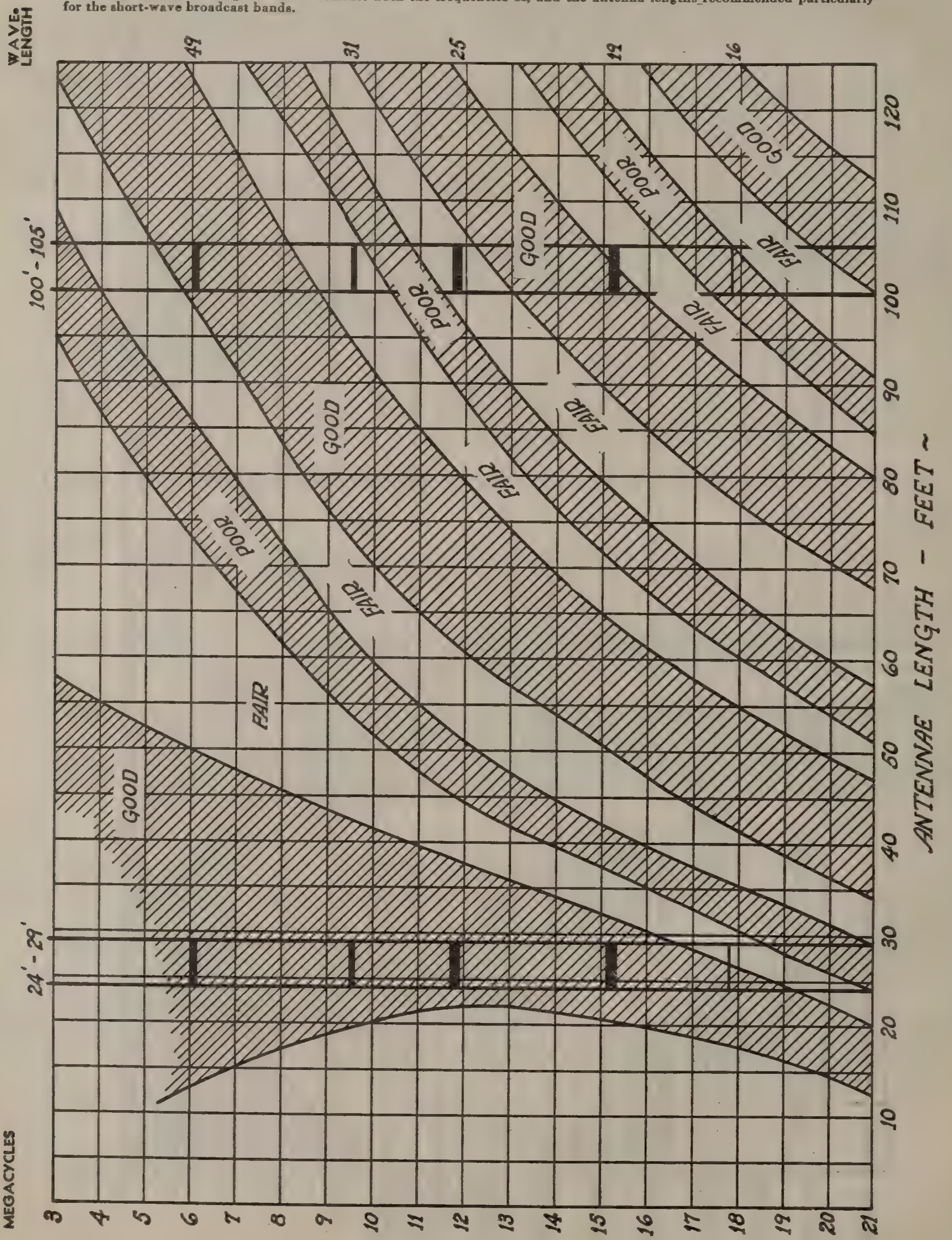
ANTENNA LENGTH CHART

(Lengths shown are overall, including Lead-in Wire to Receiver—Ground Wire not to exceed 15 feet.)

From the chart shown, it can be seen that a wide variation in signal strength can be obtained with various length antennas. This data applies particularly to the six-tube receiver and in general to the eight-tube receivers but does not necessarily apply to competitive instruments. The various degrees of reception are approximately equal for various antenna lengths. For example, the "good" sections give about four times as much sensitivity as the "poor" sections. As this is also an equal gain over noise, proper choice of antenna length can often make the difference between satisfactory and unsatisfactory reception.

In conjunction with the question of the relative merits of a short or long antenna for the frequencies that fall in the "good" sections of each, either length will be equally good, assuming that neither is shielded by buildings of metallic construction or other such objects. If, for example, part of the antenna or lead-in is shielded by the building, then the longer antenna will give better results. Also the longer antenna will give better results in the broadcast band.

The solid black rectangular blocks indicate both the frequencies of, and the antenna lengths recommended particularly for the short-wave broadcast bands.



SERVICE DIVISION

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

.0783

Printed in U. S. A.

PREDICTING SHORT-WAVE RECEPTION

Through the co-operation of H. H. Beveridge, of R.C.A. Communications, Inc., and the United States Government, we are able to outline a method of forecasting probable reception conditions for a considerable period in advance. Although these predictions are not entirely accurate, they compare in accuracy with the ordinary weather forecast, which, as we know, is generally reliable.

These predictions are based on the magnetic activity reports furnished by the United States Observatory at Tucson, Arizona. It has been found that the spots on the sun have a more or less direct relation to the magnetic conditions on earth, which in turn have a definite relation to the reception conditions for short waves.

The illustration shows a typical magnetic activity chart prepared for such predictions. On this chart, ordinates (vertical divisions) are magnetic range, one scale division being 30 gammas. If the magnetic range extends beyond 60 gammas it has been found by experience that this range is sufficient to disturb the reception of short-wave signals. Accordingly, all range above 60 gammas have been filled in with black to make it apparent, in looking at the chart, where the disturbing magnetic conditions lie.

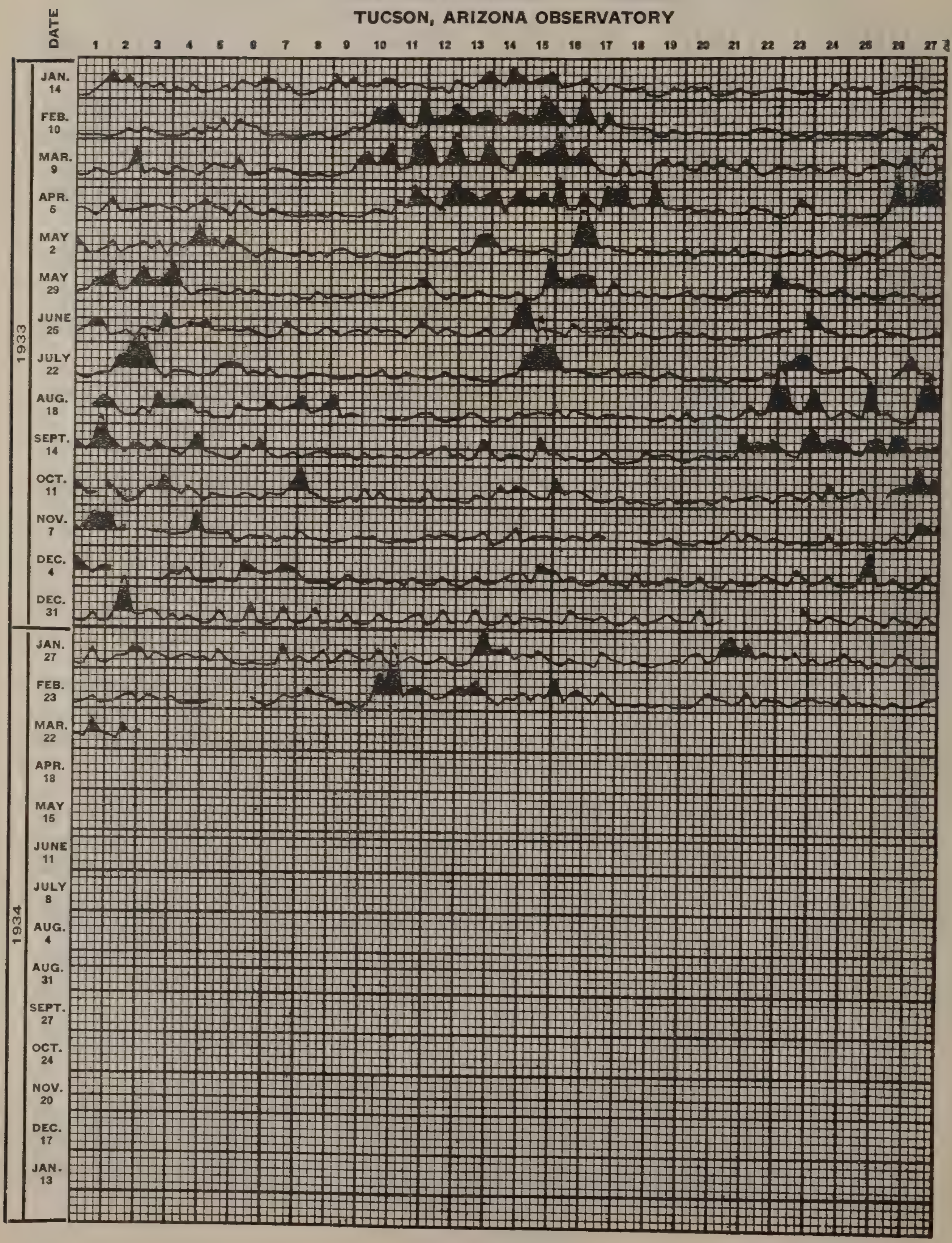
It has been found that the co-ordination between disturbed signals and magnetic range is very close, so that wherever a black peak appears on the chart, it has almost invariably been confronted with bad signal transmission.

It will be noted that the abcissa (horizontal divisions) extend from 1 to 27, indicating that the magnetic ranges are plotted on the basis of a 27-day period. The date of the first division of each 27-day period is shown on the left of each period. To find a particular date it is but necessary to count the dates from left to right, from those given.

Astronomers tell us that the Polar regions of the sun rotate once in approximately 34 days, while the Equator rotates once in approximately 24 days. Since the magnetic disturbances appear to repeat themselves on the average every 27 days, it seems probable that the sun spots which have the greatest effect on the magnetic conditions on the earth are located at such a latitude on the sun that the period of rotation is 27 days. This is the basis of the prediction service, that is, a magnetic disturbance on a certain day, say November 7th, would indicate a similar disturbance to appear again 27 days later, or on December 4th. In general, it will be noted that this repetition does occur, although it is not an invariable rule. For example, it will be noted that a severe storm occurred on August 5, 1933, but this storm did not repeat itself 27 days later, although it did appear again 54 days later with much less amplitude than on August 5th.

In this case, we would have predicted disturbed conditions on September 1st, but actually we would have found that there was no disturbance; therefore, it is not possible to guarantee the predictions, but, in general, it is possible to predict the times which are subject to disturbances and the times which are almost certain to be free from disturbances.

MAGNETIC ACTIVITY
SIX HOUR TOTALS OF HOURLY RANGES OF HORIZONTAL INTENSITY
ONE SCALE DIVISION—30 GAMMAS
TUCSON, ARIZONA OBSERVATORY



Announcing . . .

The RCA World-Wide Antenna System

A Di-Pole Antenna System for All-Wave Receivers

Stock No. 9500

The RCA World-Wide Antenna System is an expertly designed di-pole antenna system for all-wave receivers. Greatly improved signals and elimination of noise pickup between the antenna and receiver are among its numerous features.

ADVANTAGES

1. The RCA World-Wide Antenna System uses a "Double Doublet" antenna (a doublet is a special short-wave antenna), which gives as much as five times the signal pickup as that of an ordinary antenna.

2. The RCA World-Wide Antenna System uses a special transmission line between the antenna and the receiver which permits the antenna to be placed as far as 500 feet from the receiver without loss in efficiency. This transmission line also eliminates noise pickup between the antenna and the receiver.

3 The RCA World-Wide Antenna System uses a coupling transformer, located at the receiver, to properly match the transmission line to the input circuit of the receiver. A low-capacity switch is mounted on the transformer for switching from broadcast to short-wave reception so that maximum efficiency is obtained on both bands.

4. The RCA World-Wide Antenna System gives greatly improved results on the broadcast band.

5. The RCA World-Wide Antenna System greatly improves the reception of all short-wave receivers. On the older type short-wave receivers using adaptors, the results are especially desirable.

6. The RCA World-Wide Antenna System is easy to install. Stranded antenna wire is furnished in exact lengths, tinned at proper points for soldering. The transmission line is light and flexible and does not require heavy transposition blocks or cut-and-try methods for installing. A special cross-over insulator and all necessary insulators and fittings are included in the kit.

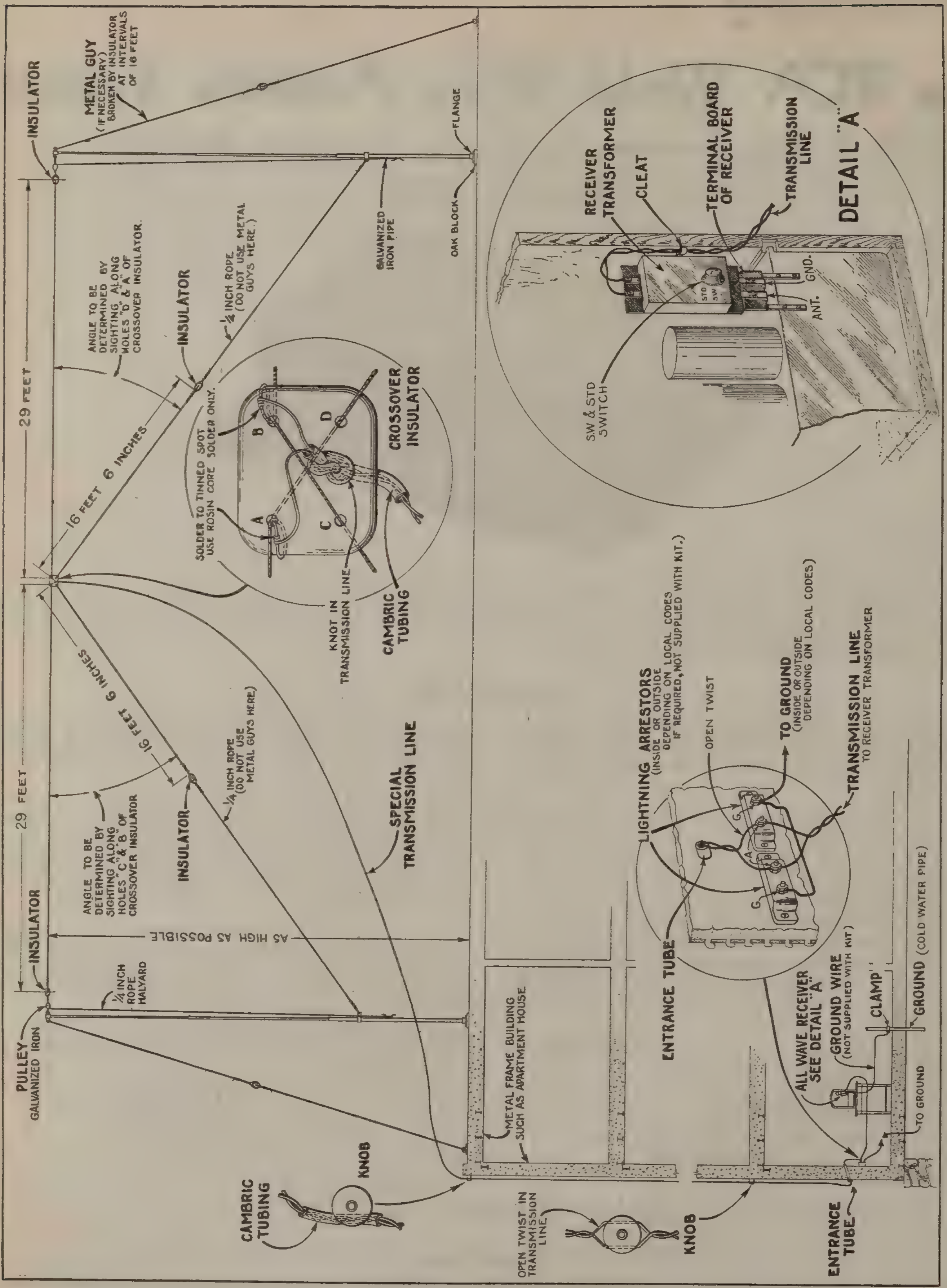
7. The RCA World-Wide Antenna System may be used in locations where physical limitations prohibit the erection of full-length antenna spans. Loading coils (obtainable as an accessory) may be used to increase the antenna lengths, electrically.

8. The RCA World-Wide Antenna System consists of a kit of parts, packed in an attractive carton and made up of the following items:

1 Antenna Transformer and Switch
1 Antenna Crossover Insulator
2 Rolls Antenna Wire—each roll 46½ ft. long
1 Roll Transmission Line—110 ft. long
4 Strain Insulators
1 Lead-in Insulator
2 Transmission Line Insulators
1 Ground Clamp
1 Transmission Line Clamp
3 Wood Screws
2 Insulating Sleeves
2 Spacers

List Price $7.00

Order from


INSULATOR
METAL GUY (IF NECESSARY) BROKEN BY INSULATOR AT INTERVALS OF 16 FEET
FLANGE
OAK BLOCK
GALVANIZED IRON PIPE
29 FEET
ANGLE TO BE DETERMINED BY SIGHTING ALONG HOLES "D" & "A" OF CROSSOVER INSULATOR.
INSULATOR
¼ INCH ROPE (DO NOT USE METAL GUYS HERE.)
16 FEET 6 INCHES
SOLDER TO TINNED SPOT USE ROSIN CORE SOLDER ONLY.
A
B
C
D
CROSSOVER INSULATOR
KNOT IN TRANSMISSION LINE
CAMBRIC TUBING
RECEIVER TRANSFORMER
CLEAT
TERMINAL BOARD OF RECEIVER
TRANSMISSION LINE
DETAIL "A"
SW & STD SWITCH
STD
SW
ANT.
GND.
16 FEET 6 INCHES
29 FEET
ANGLE TO BE DETERMINED BY SIGHTING ALONG HOLES "C" & "B" OF CROSSOVER INSULATOR
INSULATOR
¼ INCH ROPE (DO NOT USE METAL GUYS HERE)
SPECIAL TRANSMISSION LINE
LIGHTNING ARRESTORS (INSIDE OR OUTSIDE DEPENDING ON LOCAL CODES IF REQUIRED, NOT SUPPLIED WITH KIT.)
OPEN TWIST
TO GROUND (INSIDE OR OUTSIDE DEPENDING ON LOCAL CODES)
TRANSMISSION LINE TO RECEIVER TRANSFORMER
G
A
B
ENTRANCE TUBE
INSULATOR
AS HIGH AS POSSIBLE
PULLEY GALVANIZED IRON
¼ INCH ROPE HALYARD
METAL FRAME BUILDING SUCH AS APARTMENT HOUSE
ALL WAVE RECEIVER SEE DETAIL "A"
GROUND WIRE (NOT SUPPLIED WITH KIT)
CLAMP
GROUND (COLD WATER PIPE)
TO GROUND
CAMBRIC TUBING
KNOB
OPEN TWIST IN TRANSMISSION LINE
KNOB
ENTRANCE TUBE

Typical Installation of Stock No. 9500 Kit

MANUFACTURED BY

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

Printed in U. S. A.

RCA VICTOR SHIELD KITS

Stock Nos. 7717 and 7718

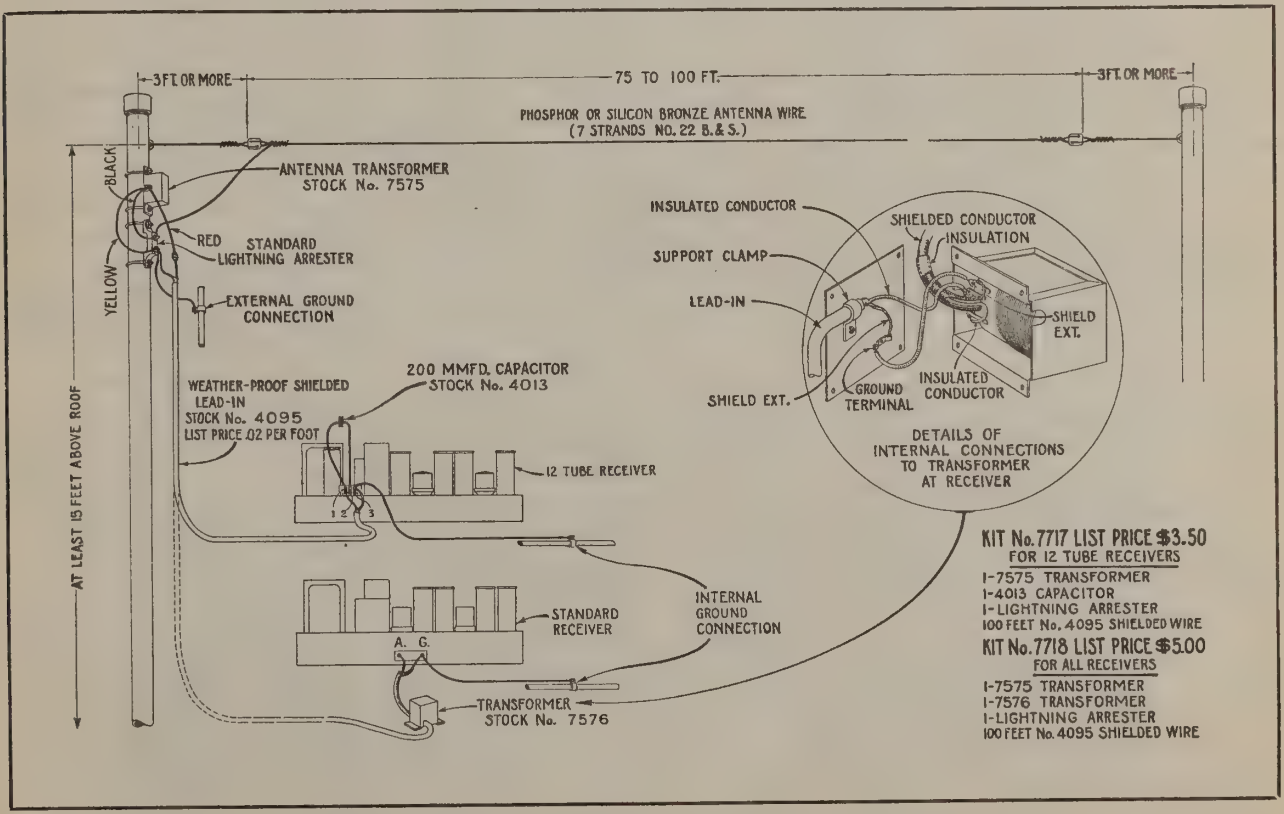
The RCA Victor Shield Kits, Stock Nos. 7717 and 7718, consist of an assembly of parts designed to be used in conjunction with radio receivers for the prevention of interference pickup by the lead-in portion of an antenna system. Inasmuch as the majority of man-made interference is picked up on the lead-in section of an antenna, installation of these kits greatly improves the ratio of signal to noise.

The Stock No. 7717 kit consists of an antenna transformer, 100 feet of low-impedance shielded lead-in wire, a 200 mmfd. capacitor and a lightning arrestor. This kit is designed to be used with RCA Victor Model 280 *only* and does not include a receiver coupling transformer. Such omission is made possible by the inclusion of a tap on the antenna coil of the Model 280, which matches the impedance of the shielded lead-in.

The Stock No. 7718 kit consists of an antenna transformer, 100 feet of shielded lead-in wire, a receiver transformer and a lightning arrestor. This kit is designed to be used with all types of broadcast receivers. The illustration below shows the proper manner of connecting these kits.

In conjunction with the Stock Nos. 7717 and 7718 kits, it must be remembered that these lead-in systems will not affect such conditions as natural atmospheric conditions which induce static into the antenna or any other noise that is picked up by the flat top portion of the antenna. To visualize the gain in these systems, the results will be approximately equal to the reception that would be obtained if the receiver were located at the top of the antenna pole.

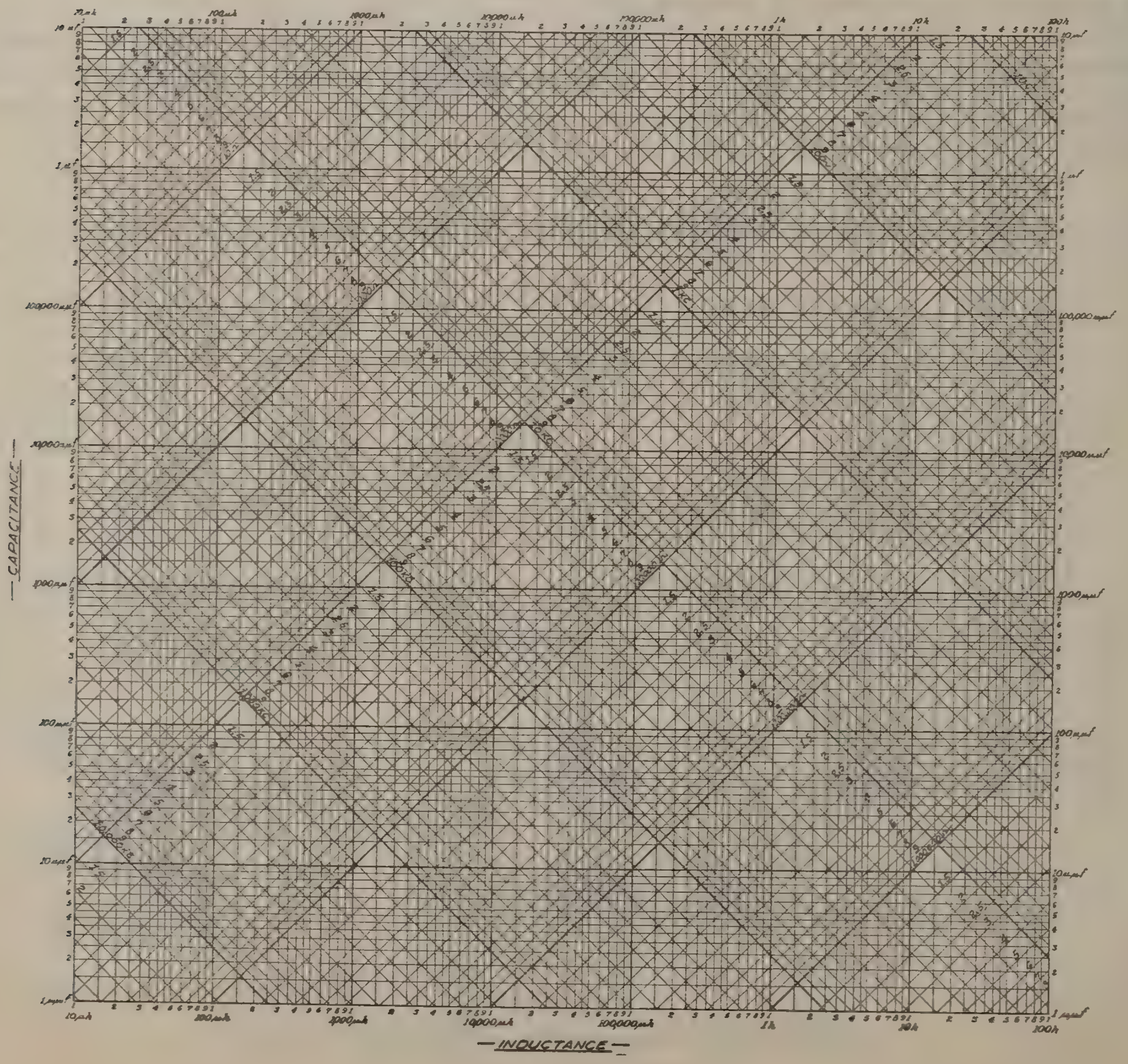
These kits will give excellent results over the entire broadcast and police frequency bands. However, they are not recommended for the short-wave broadcasting bands.


3FT. OR MORE
75 TO 100 FT.
3FT. OR MORE
PHOSPHOR OR SILICON BRONZE ANTENNA WIRE (7 STRANDS NO. 22 B.&S.)
BLACK
ANTENNA TRANSFORMER STOCK No. 7575
RED
STANDARD LIGHTNING ARRESTER
YELLOW
EXTERNAL GROUND CONNECTION
AT LEAST 15 FEET ABOVE ROOF
WEATHER-PROOF SHIELDED LEAD-IN STOCK No. 4095 LIST PRICE .02 PER FOOT
200 MMFD. CAPACITOR STOCK No. 4013
12 TUBE RECEIVER
1 2 3
INSULATED CONDUCTOR
SUPPORT CLAMP
LEAD-IN
SHIELD EXT.
SHIELDED CONDUCTOR
INSULATION
SHIELD EXT.
GROUND TERMINAL
INSULATED CONDUCTOR
DETAILS OF INTERNAL CONNECTIONS TO TRANSFORMER AT RECEIVER
INTERNAL GROUND CONNECTION
STANDARD RECEIVER
A. G.
TRANSFORMER STOCK No. 7576
KIT No. 7717 LIST PRICE $3.50
FOR 12 TUBE RECEIVERS
1-7575 TRANSFORMER
1-4013 CAPACITOR
1-LIGHTNING ARRESTER
100 FEET No. 4095 SHIELDED WIRE
KIT No. 7718 LIST PRICE $5.00
FOR ALL RECEIVERS
1-7575 TRANSFORMER
1-7576 TRANSFORMER
1-LIGHTNING ARRESTER
100 FEET No. 4095 SHIELDED WIRE

Proper Method of Connecting Kits to Antenna and Receivers

CHART OF FREQUENCY OR IMPEDANCE VS. INDUCTANCE AND CAPACITY

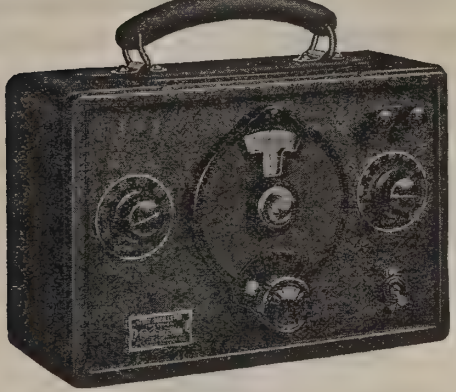
The Chart shown below provides a quick method of determining several unknown factors when one or more are known. The Chart covers a very wide range, namely, from 10 micro-henries to 100 henries inductance, 10 cycles to 50,000 kilocycles, 1 ohm to 10 megohms and 1 micro-microfarad to 10 microfarads. If, for example, one wishes to know the capacitance to use with a 10 henry inductor to have it resonate at 50 cycles, it can be readily seen that it would be a 1 mfd. capacitor. This is determined by finding the intersection of the vertical line representing 10 henries and the oblique line representing 50 cycles. The intersection occurs at the horizontal line representing 1 mfd. The other oblique line at this intersection represents the impedance at this frequency. This is approximately 3000 ohms.



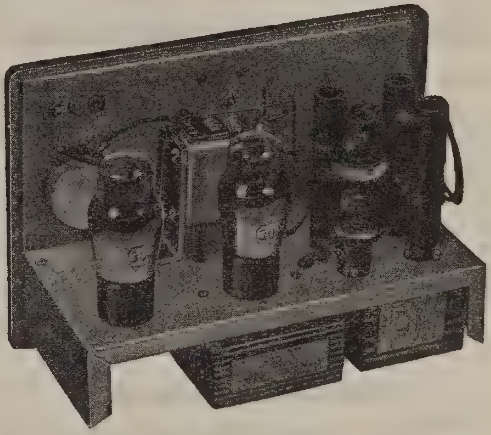
RCA

Full Range Test Oscillator

Type TMV-97-B



Front View



Rear View of Chassis

The RCA Full Range Type TMV-97-B Test Oscillator is a modulated R. F. oscillator which supersedes the Type TMV-97-A. New features are a wider frequency range, an improved calibrated tuning dial (reading in frequency) and a direct-reading range switch. All older features such as small compact size, light weight, self-contained batteries, etc., of the Type TMV-97-A are retained.

The frequency range extends continuously from 90 K. C. to 25,000 K. C. (3300–12 meters) and is divided into eight bands. This covers all intermediate, broadcast, police and short-wave frequency line-up points of all makes of receivers. An eight-position range switch provides for the selection of any desired band. An attenuator (output control) gives a means of adjusting the output to any level. This is very important in modern receivers, due to the increasing practice of combining the automatic volume control with other tubes.

Of special interest to amateurs and experimenters is the simplicity with which the modulation may be eliminated. This may be done by the use of a special adapter in the modulator socket. The oscillator then may be used as a heterodyne oscillator for short-wave superheterodyne receivers or for heterodyning the I. F. frequency of all-wave receivers to permit reception of pure CW signals.

Proper servicing of the simplest receivers is impossible without an oscillator. New designs covering an increasingly higher frequency range make the use of such an oscillator imperative. The TMV-97-B Oscillator fills the need for such apparatus at a price heretofore considered impossible

SPECIFICATIONS

Circuit—A tuned-grid, plate-modulated circuit is used, which gives good stability over a wide range of voltage and climatic conditions. The output is modulated 50% at 400 cycles.

Radiotrons—Two Radiotrons RCA-30 are used, one as an R. F. oscillator and one as an A. F. modulator.

Batteries Required—One 22½ volt "B" battery and one 4½ volt "C" battery are used. The "C" battery provides filament power for the Radiotrons, the filaments of which are connected in series.

Size—Height 8½ inches (including raised handle), case alone 6½ inches, width 9¾ inches, depth 4½ inches.

Weight—3½ lbs., including batteries.

Switch—A toggle-type operating switch for turning the oscillator "on" and "off" is mounted on the front panel.

Frequency Range—90 K. C.–25,000 K. C. by eight bands. The Range Switch is located on the front panel and marked directly in frequency.

Output—Two binding posts on the front panel, together with an attenuator, give an easy means of connecting and adjusting the output.

Dial—Variable vernier dial adjustable from 6:1 to 20:1 speed reduction. The dial glass has been made thicker so that the indicator line is very close to the dial, thus avoiding a possible parallax.

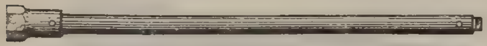
Calibration—The dial is calibrated directly in frequency to an accuracy of ±3%. Complete individual calibration may be obtained at an additional cost of $5.00.

Case—The entire oscillator is enclosed in a black wrinkle-finished aluminum case provided with a leather handle.

RCA Tools and Accessories

The following tools and accessories are useful for servicing Radio Receivers, Combinations and Short-Wave Instruments of all types and manufacture.

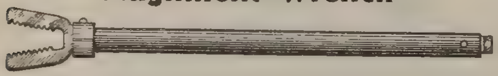
Alignment Tool



Stock No. 4160 **Net Price $0.60**

The Stock No. 4160 Alignment Tool is a bakelite shaft combination screwdriver and socket wrench. The metal screwdriver bit is so shaped that the increase in capacity caused by its touching a trimmer screw is offset by the reduction in inductance caused by its shape. This is very important when making adjustments on all-wave receivers where the screwdriver must be inserted through the end of the coil. The socket end fits the main tuning capacitor trimmer adjustment screws used on numerous RCA Victor Receivers. The bakelite shaft is 7/32″ diameter, which gives entrance to ¼″ holes, used on older model Radiola receivers.

Alignment Wrench



Stock No. 7065 **Net Price $0.50**

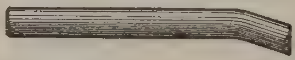
The Stock No. 7065 Alignment Wrench is a combination screwdriver and alligator jaw end wrench. The metal screwdriver bit is shaped so that it will have a minimum effect on the alignment of the set when it touches a trimmer screw. The end wrench is suitable for adjusting trimmer screws that are accessible only from the side. The shaft is of bakelite, 7/32″ diameter and the overall length is 5½″.

Riveting Punch

Stock No. 10987 **Net Price $0.50**

The Stock No. 10987 Riveting Punch is a special metal punch for use with a riveting anvil. The punch may be used with the rivets usually used on radio receivers and permits the service man to make a factory type repair, instead of using machine screws to replace rivets. The punch is 5/16″ in diameter and 5½″ long.

Riveting Anvil



Stock No. 10988 **Net Price $0.70**

The Stock No. 10988 Off-Set Riveting Anvil is a special anvil that permits riveting in places ordinarily inaccessible. It is to be used in conjunction with a riveting punch such as Stock No. 10987. The Anvil is 5/16″ in diameter and 3½″ long.

Tuning Wand

Stock No. 6679 **Net Price $1.10**

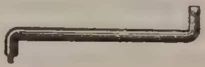
The Stock No. 6679 Tuning Wand is a special alignment tool which makes possible the checking of alignment in all-wave receivers without disturbing the adjustment of the trimmer capacitors. The tool consists of a bakelite rod having a brass cylinder at one end and a special finely divided iron core at the other end. Inserting the brass cylinder into a coil lowers its inductance, while inserting the iron increases the inductance. From this it is evident that before adjusting trimmers, the adjustment may be checked by inserting each end of the wand into the coil. Proper adjustment is evidenced by a reduction in output with either end of the wand inserted into the coil.

Knurled Nut Wrench

Stock No. 10982 **Net Price $1.20**

The Stock No. 10982 Knurled Nut Wrench is a special wrench designed for tightening or removing the knurled nuts such as are used with toggle type switches. These nuts are ordinarily impossible to remove or tighten without marring. The wrench will hold a nut from ⅜″ to ½″ diameter. The overall length is 8½″.

Off-set Screwdrivers



Stock No. 3064
Net Price $0.50

Stock No. 2930
Net Price $0.50

The Stock Nos. 3064 and 2930 Off-Set Screwdrivers are useful for making adjustments to remote control units and other small screws that are inaccessible with an ordinary screwdriver. The No. 3064 screwdriver is 2½″ long while No. 2930 has an overall length of 4⅜″.

Socket Wrench

Stock No. 10983 **Net Price $1.80**

The Stock No. 10983 Socket Wrench is a special flexible end socket wrench designed for adjusting the alignment screws of the 1929 and 1930 Victor Receivers, Models R-32, R-35, etc. The overall length is 8¾″.

MANUFACTURED BY

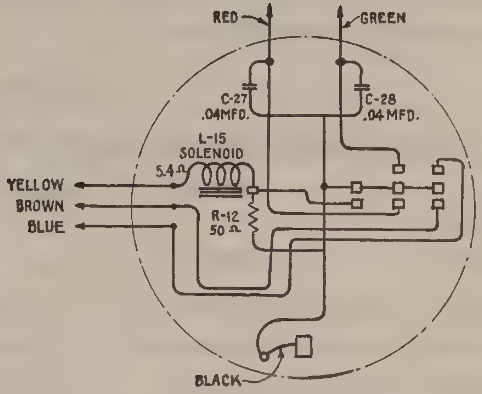
RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

RCA Victor
Sealed Replacement Vibrator

Stock No. 7604 for Model M-34 *only*

Stock No. 7604 Vibrator



Schematic Diagram

The RCA Victor Sealed Replacement Vibrator is an improved inverter-rectifier unit recommended for replacement use in the RCA Victor M-34 Automobile Receiver. High efficiency, long life and wide input voltage range are inherent features of this unit.

Proper adjustment of vibrators of this type is dependent upon laboratory equipment of advanced design. To insure proper adjustment and freedom from tampering, the Stock No. 7604 is sealed in such a manner that adjustment cannot be made without breaking the seal. This unit carries the Standard RCA Victor Guarantee for ninety days, provided the seal is unbroken.

SPECIFICATIONS

Size—Height, 4½ inches; Diameter, 2½ inches.

Input Voltage—Four to eight volts. The life of the vibrator varies inversely with the input voltage.

Circuit—Mechanical inverter with full-wave mechanical rectifier.

Output Voltage—Approximately 265 volts at 50 M.A. with 6 volts input.

Shielding—Double aluminum case with felt insulator. The entire vibrating unit is rubber-mounted.

Efficiency—Approximately 60%.

Seal—A lead seal is provided to prevent removal of the shielding cans without breaking the seal.

[List Price $5.00]

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Dealer's and Servicemen's Kits

of RCA Victor Factory Tested Parts

The first of a series of Dealer's and Servicemen's Kits to be offered is now ready for shipment. It is prepared for the 6-tube table, console and combination models of the "Selective Short Wave" Superheterodyne Receivers.

CONTENTS

Handy Parts Kit for 6-Tube RCA Victor Models 121, 122, 221, 321 and G. E. Models K-64, M-65, M-68

Qty.	*Stock No.*	*Description*	*Also Used in*	*Unit List*	*Extension*
1	9428	Cone (Table Model)	R-37, R-38, 112, 141B, 241B, 310	$1.00	$1.00
1	8935	Cone (Console Model)	RE-81, R-70, R-73, R-75, 210	1.05	1.05
1	9446	Power Transformer		5.40	5.40
2	6707	Glass (Table)		.20	.40
2	6614	Glass (Console)	220, 222, 140, 141, 240, AVR-1	.30	.60
1	6703	Capacitor Pack		2.46	2.46
1	6476	Output Transformer	RE-40, R-37, R-38	1.44	1.44
1	6697	1st IF Transformer		1.80	1.80
1	6698	2nd IF Transformer		1.78	1.78
1	6695	Volume Control		1.20	1.20
			Total Cost at List Prices		$17.13

IMPORTANT

DEALER COST

$9.26

DEALER PROFIT

$7.87

A part instantly available when need arises means a better satisfied customer. Your patrons do not forget when delays cause them to miss their most favored programs. The Handy Kit is your evidence to prospective customers that should need arise, you are prepared to handle their service requirements immediately.

Through the prompt action which you can take when called upon, you will secure new service business or new prospects for receiver sales. The Handy Kits of RCA Victor Factory Tested Parts are an investment in GOOD WILL which pays dividends in increased business. Factory TESTED PARTS ARE:

DESIGNED FOR THE JOB

BY

RCA Victor Company, Inc., Camden, N. J.

Printed in U. S. A.

MODERN TUBES FOR MODERN RECEIVERS

In the initial period of radio tube development and application, the same tube type—usually a triode—was used in every socket of a receiver. Obviously enough, one tube type could not possibly meet all receiver requirements to the best advantage. Thus, out of this pioneering grew the development of tubes to give optimum performance in particular applications—and even to combine within one bulb functions which formerly required the use of two or more tubes. This transition from "general-purpose" tubes to the highly efficient and sensitive "specialty" types has made possible the refinements of modern radio receivers, as, for example, high sensitivity, knife-edge selectivity, great power output, natural tone quality, automatic volume control, interchannel noise suppression and efficient operation—available for all classes of service—city, farm, and mobile alike.

RCA Victor sets are synonymous with modern receiver design. A number of representative examples are discussed below.

The automobile superheterodyne M-34 employs four tubes: one RCA-78, one RCA-6A7, one RCA-6B7, and one RCA-89. The RCA-78, a Triple-Grid Super-Control type, is used in the radio frequency (r-f) stage as a pentode r-f amplifier. It was selected because of its long "cut-off" feature which enables it to handle large input signal voltages with minimum cross-modulation and distortion. The RCA-6A7 operates simultaneously as a combined mixer (first detector) and oscillator to produce the intermediate frequency. The pentode section of the RCA-6B7 acts as the intermediate-frequency (i-f) amplifier which feeds into the diode units of the same tube. The diodes are connected for use as a half-wave second detector and arranged to provide automatic-volume-control (a.v.c.) voltage for the r-f and i-f stages. The audio output from the second detector is reflexed through the pentode section and then fed to the RCA-89. This tube is a Triple-Grid Power Amplifier type, with external connections for each grid. It may be used as (1) a Class A Power Amplifier Triode, (2) a Class A Power Output Pentode, and (3) a Class B Power Output Triode. In the M-34, the RCA-89 is connected as a Power Output Pentode in order to give good output with the relatively small input signal voltages. The tubes in this receiver are of the 6.3-volt heater type and are operated directly from the 6-volt car battery. The performance of this set is superior to that of many earlier a-c models employing a larger number of tubes.

The Model R-38 is a typical example of a modern a-c receiver designed to operate from the power line. It is a superheterodyne employing two RCA-58's, one RCA-2A7, one RCA-2B7, one RCA-2A5, and one RCA-80. The RCA-58, a Triple-Grid Super-Control Type designed especially for a-c operation, is used in the r-f and i-f amplifier stages as a pentode amplifier. Like the RCA-78, its remote "cut-off" feature enables it to handle large input signal voltages with minimum cross-modulation and distortion. The RCA-2A7 is used as a combined oscillator and mixer tube to generate the intermediate frequency. This tube is similar to the RCA-6A7 except that it contains a heater cathode designed for 2.5-volt a-c operation. The versatile RCA-2B7 is employed as a second-detector (diode), a.v.c. tube and first audio-frequency (a-f) amplifier. It is similar to the RCA-6B7 but designed for use in 2.5-volt a-c receivers. The RCA-2A5 is used in the last audio stage as a power output pentode. It is capable of giving high audio output with a small input signal. The feature of using a heater-cathode in the design of this tube assures a very low hum-level in the output. The RCA-80 is used as a full-wave rectifier. This popular high-vacuum rectifier tube is capable of handling the load of the average receiver and gives quiet output without the use of r-f filters and electrostatic shielding.

In the battery-operated receiver field, the superheterodyne model R-51-B illustrates RCA Victor design and merits discussion. This set employs three RCA-34's and seven RCA-30's. These tubes have 2.0-volt filaments and draw only 60 milliamperes of filament current per tube. The RCA-34 is an r-f pentode with super-control characteristics. This type is used in the r-f, first-detector, and i-f positions of the receiver. Like other Super-Control tubes it is capable of handling large-input signals with minimum cross-modulation and modulation-distortion. The RCA-30 is a triode. This type is used as an oscillator, second detector-a.v.c. tube, and Class A and B a-f amplifier. The audio section of the R-51-B receiver consists of a single 30 driving two 30's in a balanced Class B circuit. This stage drives the output Class B stage employing another pair of 30's. The R-51-B—due to the design of tubes for this particular service—compares favorably in performance with many a-c receivers, yet draws so little power as to permit economical battery operation.

The Model 140 embodies the all-wave feature, made possible by skillful coordination of efficient tubes and circuit design. A tuned radio-frequency stage employing the RCA-58 precedes a modern heterodyne circuit. For the higher frequencies (8,000–18,000 kc.) two r-f stages are used in order to minimize extraneous signal interference (image-frequency response, etc.), to improve the signal-to-noise ratio as well as to make automatic volume control more effective. These stages, as well as the i-f stage, use an RCA-58. An RCA-2A7 is used as a mixer tube. This tube is especially desirable inasmuch as it helps to simplify circuit construction, which is bound to be somewhat complicated in any multi-tube, all-wave receiver. The diode unit of the RCA-2B7 acts as the second detector-a.v.c. tube, while the pentode unit acts as an a-f amplifier to supply audio-frequency voltage to the RCA-56 driver. This tube in turn feeds an RCA-53 Class B Twin Amplifier, a tube which combines in one bulb two high-mu triodes designed for Class B operation. An RCA-80 supplies the rectified voltage for this receiver.

Model 280 is a twelve-tube superheterodyne a-c receiver incorporating many refinements, such as two-band operation (540–1500 kc. and 1400–2800 kc.), automatic volume control and silent-tuning control (noise suppression or "silencer"). The tube complement consists of four RCA-58's, four RCA-56's, one RCA-55, two RCA-59's, and one RCA-5Z3. The RCA-58 is used in the r-f amplifier, first detector, and in the signal and a.v.c. intermediate stages. RCA-56's are employed in the high-frequency oscillator and the a.v.c. stage. In the latter case it is used as a diode, a.v.c. voltage being obtained from the voltage drop across its grid-circuit resistor. RCA-56's are also used as a push-pull audio frequency amplifier to drive two RCA-59's in a balanced Class B power amplifier circuit. The RCA-55 diode section is used as a half-wave second detector. Audio-frequency voltage is obtained from this unit to supply the triode audio-amplifier of the same tube. An RCA-5Z3 is employed as a full-wave rectifier to supply the d-c plate load for the receiver.

Representative among the RCA Victor universal a-c-d-c receivers is the model R-18-W. It uses one RCA-78, one RCA-77, one RCA-38 in a tuned radio-frequency circuit, and one RCA-25Z5. These tubes were chosen because of their favorable performance at low plate voltages. The r-f stage employs the RCA-78 because of its super-control feature. The detector uses the RCA-77. The latter tube is a Triple-Grid type especially useful as a biased detector because of its ability to deliver a large a-f output voltage with relatively small input voltage. The RCA-38 pentode is used for several reasons. First, because it has a 0.3 ampere heater which permits series operation with the heaters of the other tubes in the receiver. Second, because it requires only a small input signal for full output. It is necessary to have such a tube in this position since the gain offered by only two preceding tubes is not very high. The Voltage-Doubler Rectifier RCA-25Z5 is unique in design. It consists of two heater-cathode, half-wave rectifiers enclosed in one bulb. The heater is common to both rectifier diodes. The tube may be connected as either a half-wave rectifier, full-wave rectifier, or voltage-doubler rectifier. In the case of the R-18-W, a switching arrangement permits voltage-doubler operation when the receiver is connected to the a-c line while the tube is disconnected from use (except the heater) when the set is operated from a d-c line. The heaters of all tubes in the R-18-W may be operated from a-c or d-c. They are connected in series with a voltage-dropping resistor across the supply line.

This brief discussion has been set forth to illustrate the close coordination of radio tube and circuit design principles that are observed in the construction of RCA Victor receivers. The models described are representative and incorporate the modern refinements that go to make radio reception so much more worthwhile.

Radio Tube Chart←RCA Radiotron-Cunningham→Radio Tube Chart

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH x DIAMETER	CATHODE TYPE ■	RATING: FILAMENT OR HEATER VOLTS	RATING: FILAMENT OR HEATER AMPERES	RATING: PLATE MAX. VOLTS	RATING: SCREEN MAX. VOLTS
RCA-1A6	PENTAGRID CONVERTER ⊙	SMALL 6-PIN	FIG. 28	4 17/32″ x 1 9/16″	D-C FILAMENT	2.0	0.06	180	67.5
RCA-2A3	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	5[illegible]″ x 2 1/16″	FILAMENT	2.5	2.5	250	—
RCA-2A5	POWER AMPLIFIER PENTODE	MEDIUM 6-PIN	FIG. 15A	4 11/16″ x 1 13/16″	HEATER	2.5	1.75	250	250
RCA-2A6	DUPLEX-DIODE HIGH-MU TRIODE	SMALL 6-PIN	FIG. 13	4 17/32″ x 1 9/16″	HEATER	2.5	0.8	250	—
RCA-2A7	PENTAGRID CONVERTER ⊙	SMALL 7-PIN	FIG. 20	4 17/32″ x 1 9/16″	HEATER	2.5	0.8	250	100
RCA-2B7	DUPLEX-DIODE PENTODE	SMALL 7-PIN	FIG. 21	4 17/32″ x 1 9/16″	HEATER	2.5	0.8	250	125
RCA-6A4 *also LA*	POWER AMPLIFIER PENTODE	MEDIUM 5-PIN	FIG. 6	4 11/16″ x 1 13/16″	FILAMENT	6.3	0.3	180	180
RCA-6A7	PENTAGRID CONVERTER ⊙	SMALL 7-PIN	FIG. 20	4 17/32″ x 1 9/16″	HEATER	6.3	0.3	250	100
RCA-6B7	DUPLEX-DIODE PENTODE	SMALL 7-PIN	FIG. 21	4 17/32″ x 1 9/16″	HEATER	6.3	0.3	250	125
RCA-6F7	TRIODE-PENTODE	SMALL 7-PIN	FIG. 27	4 17/32″ x 1 9/16″	HEATER	6.3	0.3	100 250	— 100
UX-200-A	DETECTOR TRIODE	MEDIUM 4-PIN	FIG. 1	4 11/16″ x 1 13/16″	D-C FILAMENT	5.0	0.25	45	—
RCA-01-A	DETECTOR★ AMPLIFIER	MEDIUM 4-PIN	FIG. 1	4 11/16″ x 1 13/16″	D-C FILAMENT	5.0	0.25	135	—
RCA-10	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	5 5/8″ x 2 3/16″	FILAMENT	7.5	1.25	425	—

⊙Grids #3 and #5 are screen. Grid #4 is signal-input control-grid.
★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH x DIAMETER	CATHODE TYPE ■	RATING: FILAMENT OR HEATER VOLTS	RATING: FILAMENT OR HEATER AMPERES	RATING: PLATE MAX. VOLTS	RATING: SCREEN MAX. VOLTS
WD-11 WX-12	DETECTOR★ AMPLIFIER TRIODE	WD 4-PIN MEDIUM 4-PIN	FIG. 12 FIG. 1	4 1/8″ x 1 3/16″ 4 11/16″ x 1 7/16″	D-C FILAMENT	1.1	0.25	135	—
UX-112-A	DETECTOR★ AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 11/16″ x 1 13/16″	D-C FILAMENT	5.0	0.25	180	—
RCA-19	TWIN AMPLIFIER	SMALL 6-PIN	FIG. 25	4 1/4″ x 1 9/16″	D-C FILAMENT	2.0	0.26	135	—
UX-120	POWER AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	4 1/8″ x 1 3/16″	D-C FILAMENT	3.3	0.132	135	—
RCA-22	R-F AMPLIFIER TETRODE	MEDIUM 4-PIN	FIG. 4	5 1/32″ x 1 13/16″	D-C FILAMENT	3.3	0.132	135	67.5
RCA-24-A	R-F AMPLIFIER TETRODE	MEDIUM 5-PIN	FIG. 9	5 1/32″ x 1 13/16″	HEATER	2.5	1.75	275	90
RCA-26	AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4 11/16″ x 1 13/16″	FILAMENT	1.5	1.05	180	—
RCA-27	DETECTOR★ AMPLIFIER TRIODE	MEDIUM 5-PIN	FIG. 8	4 11/16″ x 1 13/16″	HEATER	2.5	1.75	275	—
RCA-30	DETECTOR★ AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	4 1/4″ x 1 9/16″	D-C FILAMENT	2.0	0.06	180	—
RCA-31	POWER AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	4 1/4″ x 1 9/16″	D-C FILAMENT	2.0	0.13	180	—
RCA-32	R-F AMPLIFIER TETRODE	MEDIUM 4-PIN	FIG. 4	5 1/32″ x 1 13/16″	D-C FILAMENT	2.0	0.06	180	67.5
RCA-33	POWER AMPLIFIER PENTODE	MEDIUM 5-PIN	FIG. 6	4 11/16″ x 1 13/16″	D-C FILAMENT	2.0	0.26	135	135
RCA-34	SUPER-CONTROL R-F AMPLIFIER PENTODE	MEDIUM 4-PIN	FIG. 4A	5 1/32″ x 1 13/16″	D-C FILAMENT	2.0	0.06	180	67.5
RCA-35	SUPER-CONTROL R-F AMPLIFIER TETRODE	MEDIUM 5-PIN	FIG. 9	5 1/32″ x 1 13/16″	HEATER	2.5	1.75	275	90

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.
■Either A. C. or D. C. may be used on filament or heater, except as specifically noted. For use of D. C. on A-C filament types, decrease stated grid volts by ½ (approx.) of filament voltage.

USE Values to right give operating conditions and characteristics for indicated typical use	PLATE SUPPLY VOLTS	GRID VOLTS■	SCREEN VOLTS	SCREEN MILLI-AMP.	PLATE MILLI-AMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICROMHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
CONVERTER	180	−3.0 min.	67.5	2.4	1.3	500000	Anode-Grid (#2) 135 Max. Volts, 2.3 Ma. Oscillator Grid (#1) Resistor, 50000 Ohms. Conversion Conductance, 300 Micromhos.				C-1A6
CLASS A AMPLIFIER	250	−45	—	—	60.0	300	5250	4.2	2500	3.5	C-2A3
PUSH-PULL AMPLIFIER	300 300	−62 −62	Self-bias Fixed-bias		40.0 40.0	Power Output is for 2 tubes at stated load, plate-to-plate			5000 3000	10.0 15.0	
CLASS A AMPLIFIER	250	−16.5	250	6.5	34.0	100000	2200	220	7000	3.0	C-2A5
TRIODE UNIT AS CLASS A AMPLIFIER	250✖	− 1.35	—	—	0.4	—	—	Gain per stage = 50-60			C-2A6
CONVERTER	250	− 3.0	100	2.2	3.5	360000	Anode Grid (#2) 200 Max. Volts, 4.0 Ma. Oscillator Grid (#1) Resistor, 50000 Ohms. Conversion Conductance, 520 Micromhos.				C-2A7
PENTODE UNIT AS R-F AMPLIFIER	100 250	− 3.0 − 3.0	100 125	1.7 2.3	5.8 9.0	300000 650000	950 1125	285 730	—	—	C-2B7
PENTODE UNIT AS A-F AMPLIFIER	250✠	− 4.5	50	—	0.65	—	—	—	—	—	
CLASS A AMPLIFIER	100 180	− 6.5 −12.0	100 180	1.6 3.9	9.0 22.0	83250 45500	1200 2200	100 100	11000 8000	0.31 1.40	C-6A4 *also LA*
CONVERTER	250	− 3.0	100	2.2	3.5	360000	Anode Grid (#2) 200 Max. Volts, 4.0 Ma. Oscillator Grid (#1) Resistor, 50000 Ohms. Conversion Conductance, 520 Micromhos.				C-6A7
PENTODE UNIT AS R-F AMPLIFIER	100 250	− 3.0 − 3.0	100 125	1.7 2.3	5.8 9.0	300000 650000	950 1125	285 730	—	—	C-6B7
PENTODE UNIT AS A-F AMPLIFIER	250✠	− 4.5	50	—	0.65	—	—	—	—	—	
TRIODE UNIT AS AMPLIFIER	100	− 3.0	—	—	3.5	17800	450	8	—	—	C -6F7
PENTODE UNIT AS AMPLIFIER	250	− 3.0	100	1.5	6.5	850000	1100	900	—	—	
PENTODE UNIT AS MIXER	250	−10.0	100	0.6	2.8	Oscillator peak volts = 7.0. Conversion conductance = 300 micromhos.					
GRID LEAK DETECTOR	45	Grid Return to (−) Filament			1.5	30000	666	20	—	—	CX-300-A
CLASS A AMPLIFIER	90 135	− 4.5 − 9.0	—	—	2.5 3.0	11000 10000	725 800	8.0 8.0	—	—	C - 01-A
CLASS A AMPLIFIER	350 425	−31.0 −39.0	—	—	16.0 18.0	5150 5000	1550 1600	8.0 8.0	11000 10200	0.9 1.6	C - 10

✠Applied through plate coupling resistor of 200000 ohms.
✖Applied through plate coupling resistor of 250000 ohms.

USE Values to right give operating conditions and characteristics for indicated typical use	PLATE SUPPLY VOLTS	GRID VOLTS■	SCREEN VOLTS	SCREEN MILLI-AMP.	PLATE MILLI-AMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICROMHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
CLASS A AMPLIFIER	90 135	− 4.5 −10.5	—	—	2.5 3.0	15500 15000	425 440	6.6 6.6	—	—	C - 11 CX- 12
CLASS A AMPLIFIER	90 180	− 4.5 −13.5	—	—	5.0 7.7	5400 4700	1575 1800	8.5 8.5	—	—	CX-112-A
CLASS B AMPLIFIER	135 135	0 − 3.0	—	—	Power output value is for one tube at stated load, plate-to-plate.				10000 10000	2.1 1.9	C - 19
CLASS A AMPLIFIER	90 135	−16.5 −22.5	—	—	3.0 6.5	8000 6300	415 525	3.3 3.3	9600 6500	0.045 0.110	CX-220
SCREEN GRID R-F AMPLIFIER	135 135	− 1.5 − 1.5	45 67.5	0.6* 1.3*	1.7 3.7	725000 325000	375 500	270 160	—	—	C - 22
SCREEN GRID R-F AMPLIFIER	180 250	− 3.0 − 3.0	90 90	1.7* 1.7*	4.0 4.0	400000 600000	1000 1050	400 630	—	—	C - 24-A
BIAS DETECTOR	275●	− 5.0 approx.	20 to 45	—	Plate current to be adjusted to 0.1 milliampere with no signal.						
CLASS A AMPLIFIER	90 180	− 7.0 −14.5	—	—	2.9 6.2	8900 7300	935 1150	8.3 8.3	—	—	C - 26
CLASS A AMPLIFIER	135 250	− 9.0 −21.0	—	—	4.5 5.2	9000 9250	1000 975	9.0 9.0	—	—	C - 27
BIAS DETECTOR	250	−30.0	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
CLASS A AMPLIFIER	90 135 180	− 4.5 − 9.0 −13.5	—	—	2.5 3.0 3.1	11000 10300 10300	850 900 900	9.3 9.3 9.3	—	—	C - 30
CLASS A AMPLIFIER	135 180	−22.5 −30.0	—	—	8.0 12.3	4100 3600	925 1050	3.8 3.8	7000 5700	0.185 0.375	C - 31
SCREEN GRID R-F AMPLIFIER	135 180	− 3.0 − 3.0	67.5 67.5	0.4* 0.4*	1.7 1.7	950000 1200000	640 650	610 780	—	—	C - 32
BIAS DETECTOR	180♥	− 6.0 approx.	67.5	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
CLASS A AMPLIFIER	135	−13.5	135	3.0	14.5	50000	1450	70	7000	0.7	C - 33
SCREEN GRID R-F AMPLIFIER	135 180	− 3.0 min.	67.5 67.5	1.0 1.0	2.8 2.8	600000 1000000	600 620	360 620	—	—	C - 34
SCREEN GRID R-F AMPLIFIER	180 250	− 3.0 min.	90 90	2.5* 2.5*	6.3 6.5	300000 400000	1020 1050	305 420	—	—	C - 35

●Applied through plate coupling resistor of 250000 ohms or 500-henry choke shunted by 0.25 megohm resistor.
♥Applied through plate coupling resistor of 100000 ohms.

*Maximum.

Radio Tube Chart (Continued)←RCA Radiotron-Cunningham→Radio Tube Chart (Continued)

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH × DIAMETER	CATHODE TYPE■	RATING FILAMENT OR HEATER VOLTS	RATING FILAMENT OR HEATER AMPERES	RATING PLATE MAX. VOLTS	RATING SCREEN MAX. VOLTS
RCA- 36	R-F AMPLIFIER TETRODE	SMALL 5-PIN	FIG. 9	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	90
RCA- 37	DETECTOR★ AMPLIFIER TRIODE	SMALL 5-PIN	FIG. 8	4$\frac{1}{4}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	—
RCA- 38	POWER AMPLIFIER PENTODE	SMALL 5-PIN	FIG. 9A	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	250
RCA-39-44	SUPER-CONTROL R-F AMPLIFIER PENTODE	SMALL 5-PIN	FIG. 9A	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	90
UX -240	VOLTAGE AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	D-C FILAMENT	5.0	0.25	180	—
RCA- 41	POWER AMPLIFIER PENTODE	SMALL 6-PIN	FIG. 15A	4$\frac{1}{4}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.4	250	250
RCA- 42	POWER AMPLIFIER PENTODE	MEDIUM 6-PIN	FIG. 15A	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	HEATER	6.3	0.7	250	250
RCA- 43	POWER AMPLIFIER PENTODE	MEDIUM 6-PIN	FIG. 15A	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	HEATER	25.0	0.3	135	135
RCA- 45	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	FILAMENT	2.5	1.5	275	—
RCA- 46	DUAL-GRID POWER AMPLIFIER	MEDIUM 5-PIN	FIG. 7	5$\frac{5}{8}$" x 2$\frac{3}{16}$"	FILAMENT	2.5	1.75	250 400	— —
RCA- 47	POWER AMPLIFIER PENTODE	MEDIUM 5-PIN	FIG. 6	5$\frac{5}{8}$" x 2$\frac{3}{16}$"	FILAMENT	2.5	1.75	250	250
RCA- 48	POWER AMPLIFIER TETRODE	MEDIUM 6-PIN	FIG. 16	5$\frac{3}{8}$" x 2$\frac{1}{16}$"	D-C HEATER	30.0	0.4	125	100

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL LENGTH × DIAMETER	CATHODE TYPE■	RATING FILAMENT OR HEATER VOLTS	RATING FILAMENT OR HEATER AMPERES	RATING PLATE MAX. VOLTS	RATING SCREEN MAX. VOLTS
RCA- 49	DUAL-GRID POWER AMPLIFIER	MEDIUM 5-PIN	FIG. 7	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	D-C FILAMENT	2.0	0.120	135 180	— —
UX -250	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	6$\frac{1}{4}$" x 2$\frac{11}{16}$"	FILAMENT	7.5	1.25	450	—
RCA- 53	TWIN-TRIODE AMPLIFIER	MEDIUM 7-PIN♯	FIG. 24	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	HEATER	2.5	2.0	300	—
RCA- 55	DUPLEX-DIODE TRIODE	SMALL 6-PIN	FIG. 13	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	2.5	1.0	250	—
RCA- 56	SUPER-TRIODE AMPLIFIER DETECTOR★	SMALL 5-PIN	FIG. 8	4$\frac{1}{4}$" x 1$\frac{9}{16}$"	HEATER	2.5	1.0	250	—
RCA- 57	TRIPLE-GRID AMPLIFIER DETECTOR	SMALL 6-PIN	FIG. 11	4$\frac{15}{16}$" x 1$\frac{9}{16}$"	HEATER	2.5	1.0	250	100
RCA- 58	TRIPLE GRID SUPER-CONTROL AMPLIFIER	SMALL 6-PIN	FIG. 11	4$\frac{15}{16}$" x 1$\frac{9}{16}$"	HEATER	2.5	1.0	250	100
RCA- 59	TRIPLE-GRID POWER AMPLIFIER	MEDIUM 7-PIN♯	FIG. 18	5$\frac{3}{8}$" x 2$\frac{1}{16}$"	HEATER	2.5	2.0	250 250 400	— 250 —
RCA- 71-A	POWER AMPLIFIER TRIODE	MEDIUM 4-PIN	FIG. 1	4$\frac{11}{16}$" x 1$\frac{13}{16}$"	FILAMENT	5.0	0.25	180	—
RCA- 75	DUPLEX-DIODE HIGH-MU TRIODE	SMALL 6-PIN	FIG. 13	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	—
RCA- 77	TRIPLE-GRID AMPLIFIER DETECTOR	SMALL 6-PIN	FIG. 11	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	100
RCA- 78	TRIPLE-GRID SUPER-CONTROL AMPLIFIER	SMALL 6-PIN	FIG. 11	4$\frac{17}{32}$" x 1$\frac{9}{16}$"	HEATER	6.3	0.3	250	125

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.
■Either A. C. or D. C. may be used on filament or heater, except as specifically noted. For use of D. C. on A-C filament types, decrease stated grid volts by ½ (approx.) of filament voltage.
♯Requires different socket from small 7-pin.

USE Values to right give operating conditions and characteristics for indicated typical use	PLATE SUPPLY VOLTS	GRID VOLTS■	SCREEN VOLTS	SCREEN MILLI-AMP.	PLATE MILLI-AMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICRO-MHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
SCREEN GRID R-F AMPLIFIER	100 180 250	− 1.5 − 3.0 − 3.0	55 90 90	— — 1.7*	1.8 3.1 3.2	550000 500000 550000	850 1050 1080	470 525 595	—	—	C - 36
BIAS DETECTOR	100● 250●	− 5.0 − 8.0	55 90	—	Plate current to be adjusted to 0.1 milliampere with no signal.						
CLASS A AMPLIFIER	90 180 250	− 6.0 −13.5 −18.0	—	—	2.5 4.3 7.5	11500 10200 8400	800 900 1100	9.2 9.2 9.2	—	—	C - 37
BIAS DETECTOR	90 250	−10.0 −28.0	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
CLASS A AMPLIFIER	100 180 250	− 9.0 −18.0 −25.0	100 180 250	1.2 2.4 3.8	7.0 14.0 22.0	140000 110000 100000	875 1050 1200	120 120 120	15000 11600 10000	0.27 1.00 2.50	C - 38
SCREEN GRID R-F AMPLIFIER	90 180 250	(− 3.0 min.)	90 90 90	1.6 1.4 1.4	5.6 5.8 5.8	375000 750000 1000000	960 1000 1050	360 750 1050	—	—	C -39-44
CLASS A AMPLIFIER	135✖ 180✖	− 1.5 − 3.0	—	—	0.2 0.2	150000 150000	200 200	30 30	—	—	CX-340
CLASS A AMPLIFIER	100 180 250	− 7.0 −13.5 −18.0	100 180 250	1.6 3.0 5.5	9.0 18.5 32.0	103500 81000 68000	1450 1850 2200	150 150 150	12000 9000 7600	0.33 1.50 3.40	C - 41
CLASS A AMPLIFIER	250	−16.5	250	6.5	34.0	100000	2200	220	7000	3.00	C - 42
CLASS A AMPLIFIER	100 135	−15.0 −20.0	100 135	4.0 7.0	20.0 34.0	45000 35000	2000 2300	90 80	4500 4000	0.90 2.00	C - 43
CLASS A AMPLIFIER	180 250 275	−31.5 −50.0 −56.0	180 250 275	—	31.0 34.0 36.0	1650 1610 1700	2125 2175 2050	3.5 3.5 3.5	2700 3900 4600	0.82 1.60 2.00	C - 45
CLASS A AMPLIFIER □	250	−33.0	—	—	22.0	2380	2350	5.6	6400	1.25	C - 46
CLASS B AMPLIFIER ◆	300 400	0 0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				5200 5800	16.0 20.0	
CLASS A AMPLIFIER	250	−16.5	250	6.0	31.0	60000	2500	150	7000	2.7	C - 47
CLASS A AMPLIFIER	95 125	−20.0 −22.5	95 100	9.0 9.0	47.0 50.0	10000 10000	2800 2800	28 28	2000 2000	1.6 2.5	C - 48

● Applied through plate coupling resistor of 250000 ohms or 500-henry choke shunted by 0.25 megohm resistor.
✖Applied through plate coupling resistor of 250000 ohms. ◆Two grids tied together. *Maximum.

USE Values to right give operating conditions and characteristics for indicated typical use	PLATE SUPPLY VOLTS	GRID VOLTS■	SCREEN VOLTS	SCREEN MILLI-AMP.	PLATE MILLI-AMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICRO-MHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
CLASS A AMPLIFIER □	135	−20.0	—	—	5.7	4000	1125	4.5	11000	0.17	C - 49
CLASS B AMPLIFIER ◆	180	0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				12000	3.5	
CLASS A AMPLIFIER	300 400 450	−54.0 −70.0 −84.0	—	—	35.0 55.0 55.0	2000 1800 1800	1900 2100 2100	3.8 3.8 3.8	4600 3670 4350	1.6 3.4 4.6	CX-350
CLASS B AMPLIFIER	250 300	0 0	—	—	Power output value is for one tube at stated load, plate-to-plate.				8000 10000	8.0 10.0	C - 53
TRIODE UNIT AS CLASS A AMPLIFIER	135 180 250	−10.5 −13.5 −20.0	—	—	3.7 6.0 8.0	11000 8500 7500	750 975 1100	8.3 8.3 8.3	25000 20000 20000	0.075 0.160 0.350	C - 55
CLASS A AMPLIFIER	250	−13.5	—	—	5.0	9500	1450	13.8	—	—	C - 56
BIAS DETECTOR	250	−20.0	—	—	Plate current to be adjusted to 0.2 milliampere with no signal.						
SCREEN GRID R-F AMPLIFIER	250	− 3.0	100	0.5	2.0	exceeds 1.5 meg.	1225	exceeds 1500	—	—	C - 57
BIAS DETECTOR	250	− 3.9	100	Cathode current 0.97 ma.		—	Plate coupling resistor 250000 ohms. Grid coupling resistor 250000 ohms**.				
SCREEN GRID R-F AMPLIFIER	250	(− 3.0 min.)	100	2.0	8.2	800000	1600	1280	—	—	C - 58
MIXER IN SUPERHETERODYNE	250	−10.0	100	—	—	Oscillator peak volts = 7.0.					
AS TRIODE ¶ CLASS A AMPLIFIER	250	−28.0	—	—	26.0	2400	2600	6.0	5000	1.25	C - 59
AS PENTODE ■■ CLASS A AMPLIFIER	250	−18.0	250	9.0	35.0	40000	2500	100	6000	3.00	
AS TRIODE ● CLASS B AMPLIFIER	300 400	0 0	—	—	Power output values are for 2 tubes at indicated plate-to-plate load.				4600 6000	15.0 20.0	
CLASS A AMPLIFIER	90 180	−19.0 −43.0	—	—	10.0 20.0	2170 1750	1400 1700	3.0 3.0	3000 4800	0.125 0.790	C - 71-A
TRIODE UNIT AS CLASS A AMPLIFIER	250✖	−1.35	—	—	0.4	—	—	Gain per stage = 50-60			C - 75
SCREEN GRID R-F AMPLIFIER	100 250	− 1.5 − 3.0	60 100	0.4 0.6	1.7 2.3	650000 1500000	1100 1250	715 1500	—	—	C - 77
BIAS DETECTOR	250	− 1.95	50	Cathode current 0.65 ma.		—	Plate coupling resistor 250000 ohms. Grid coupling resistor 250000 ohms**.				
SCREEN GRID R-F AMPLIFIER	90 180 250 250	(− 3.0 min.)	90 75 100 125	1.5 1.0 2.0 3.0	5.4 4.0 7.0 10.5	315000 1000000 800000 600000	1275 1100 1450 1650	400 1100 1160 990	—	—	C - 78

■■Grid #1 is control grid. Grid #2 is screen. Grid #3 tied to cathode. ◆Two grids tied together.
¶Grid #1 is control grid. Grids #2 and #3 tied to plate. ✖Applied through plate coupling resistor of 250000 ohms.
●Grids #1 and #2 connected together. Grid #3 tied to plate. **For grid of following tube.

Radio Tube Chart (Continued)←RCA Radiotron-Cunningham→Radio Tube Chart (Continued)

TYPE	NAME	BASE	SOCKET CONNECTIONS	DIMENSIONS MAXIMUM OVERALL	CATHODE TYPE ■	RATING			
				LENGTH x DIAMETER		FILAMENT OR HEATER		PLATE	SCREEN
						VOLTS	AMPERES	MAX. VOLTS	MAX. VOLTS
RCA- 79	TWIN-TRIODE AMPLIFIER	SMALL 6-PIN	FIG. 19	$4\frac{17}{32}''$ x $1\frac{9}{16}''$	HEATER	6.3	0.6	250	—
RCA- 85	DUPLEX-DIODE TRIODE	SMALL 6-PIN	FIG. 13	$4\frac{17}{32}''$ x $1\frac{9}{16}''$	HEATER	6.3	0.3	250	—
RCA- 89	TRIPLE-GRID POWER AMPLIFIER	SMALL 6-PIN	FIG. 14	$4\frac{17}{32}''$ x $1\frac{9}{16}''$	HEATER	6.3	0.4	250	250
UV -199 UX -199	DETECTOR★ AMPLIFIER TRIODE	SMALL 4-NUB SMALL 4-PIN	FIG. 10 FIG. 1	$3\frac{1}{2}''$ x $1\frac{1}{16}''$ $4\frac{1}{8}''$ x $1\frac{3}{16}''$	D-C FILAMENT	3.3	0.063	90	—
RCA-864	AMPLIFIER TRIODE	SMALL 4-PIN	FIG. 1	$4''$ x $1\frac{3}{16}''$	D-C FILAMENT	1.1	0.25	135	—

★For Grid-leak Detection—plate volts 45, grid return to + filament or to cathode.
■Either A. C. or D. C. may be used on filament or heater, except as specifically noted. For use of D. C. on A-C filament types, decrease stated grid volts by ½ (approx.) of filament voltage.

RECTIFIERS

RCA-5Z3	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	$5\frac{3}{8}''$ x $2\frac{1}{16}''$	FILAMENT	5.0	3.0	—	—
RCA-12Z3	HALF-WAVE RECTIFIER	SMALL 4-PIN	FIG. 22	$4\frac{1}{4}''$ x $1\frac{9}{16}''$	HEATER	12.6	0.3	—	—
RCA-25Z5	RECTIFIER-DOUBLER	SMALL 6-PIN	FIG. 5	$4\frac{1}{4}''$ x $1\frac{9}{16}''$	HEATER	25.0	0.3	—	—
RCA-1-v°	HALF-WAVE RECTIFIER	SMALL 4-PIN	FIG. 22	$4\frac{1}{4}''$ x $1\frac{9}{16}''$	HEATER	6.3	0.3	—	—
RCA- 80	FULL-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 2	$4\frac{11}{16}''$ x $1\frac{13}{16}''$	FILAMENT	5.0	2.0	—	—
UX -281	HALF-WAVE RECTIFIER	MEDIUM 4-PIN	FIG. 3	$6\frac{1}{4}''$ x $2\frac{7}{16}''$	FILAMENT	7.5	1.25	—	—
RCA- 82	FULL-WAVE▶ RECTIFIER	MEDIUM 4-PIN	FIG. 2	$4\frac{11}{16}''$ x $1\frac{13}{16}''$	FILAMENT	2.5	3.0	—	—
RCA- 83	FULL-WAVE▶ RECTIFIER	MEDIUM 4-PIN	FIG. 2	$5\frac{3}{8}''$ x $2\frac{1}{16}''$	FILAMENT	5.0	3.0	—	—
RCA- 84 *also 6Z4*	FULL-WAVE RECTIFIER	SMALL 5-PIN	FIG. 23	$4\frac{1}{4}''$ x $1\frac{9}{16}''$	HEATER	6.3	0.5	—	—
RCA-866	HALF-WAVE▶ RECTIFIER	MEDIUM 4-PIN	FIG. 3 See Note ⊟	$6\frac{5}{8}''$ x $2\frac{7}{16}''$	FILAMENT	2.5	5.0	—	—

▶Mercury Vapor Type. ° Interchangeable with type 1.
⊟ Plate connection made to top cap of tube.

PHOTOTUBES

RCA-868	PHOTOTUBE	SMALL 4-PIN	FIG. 1 See Note→	$4\frac{1}{8}''$ x $1\frac{3}{16}''$	Note: Pins No. 1 and No. 3—No Connections, Pin No. 2—Anode (+), Pin No. 4—Cathode (—).

INDEX OF TYPES BY USE AND BY CATHODE VOLTAGE

CATHODE VOLTS	POWER AMPLIFIERS	VOLTAGE AMPLIFIERS *Including Duplex-Diode Types*	CONVERTERS IN SUPERHETERODYNES
1.1	—	11, 12, 864	—
1.5	—	26	—
2.0	19, 31, 33, 49	30, 32, 34	1A6
2.5	2A3, 2A5, 45, 46, 47, 53, 59	2A6, 2B7, 24-A, 27, 35, 55, 56, 57, 58	2A7
3.3	'20	22, '99	—
5.0	112-A, 71-A	01-A, '40, 112-A	—
6.3	6A4, 38, 41, 42, 79, 89	6B7, 6F7, 36, 37, 39-44, 75, 77, 78, 85	6A7, 6F7
7.5	10, '50	—	—
12.6	—	—	—
25.0	43	—	—
30.0	48	—	—

USE Values to right give operating conditions and characteristics for indicated typical use	PLATE SUPPLY VOLTS	GRID VOLTS ■	SCREEN VOLTS	SCREEN MILLI-AMP.	PLATE MILLI-AMP.	A-C PLATE RESISTANCE OHMS	MUTUAL CONDUCTANCE MICRO-MHOS	VOLTAGE AMPLIFICATION FACTOR	LOAD FOR STATED POWER OUTPUT OHMS	POWER OUTPUT WATTS	TYPE
CLASS B AMPLIFIER	180 250	0 0	—	—	Power output value is for one tube at stated load, plate-to-plate.				7000 14000	5.5 8.0	C - 79
TRIODE UNIT AS CLASS A AMPLIFIER	135 180 250	−10.5 −13.5 −20.0	—	—	3.7 6.0 8.0	11000 8500 7500	750 975 1100	8.3 8.3 8.3	25000 20000 20000	0.075 0.160 0.350	C - 85
AS TRIODE ¶ CLASS A AMPLIFIER	160 180 250	−20.0 −22.5 −31.0	—	—	17.0 20.0 32.0	3300 3000 2600	1425 1550 1800	4.7 4.7 4.7	7000 6500 5500	0.300 0.400 0.900	C - 89
AS PENTODE ■■ CLASS A AMPLIFIER	100 180 250	−10.0 −18.0 −25.0	100 180 250	1.6 3.0 5.5	9.5 20.0 32.0	104000 80000 70000	1200 1550 1800	125 125 125	10700 8000 6750	0.33 1.50 3.40	
AS TRIODE ● CLASS B AMPLIFIER	180	0	—	—	Power output values are for 2 tubes operating at indicated plate-to-plate load.				13600 9400	2.50 3.50	
CLASS A AMPLIFIER	90	− 4.5	—	—	2.5	15500	425	6.6	—	—	C -299 CX-299
CLASS A AMPLIFIER	90 135	− 4.5 − 9.0	—	—	2.9 3.5	13500 12700	610 645	8.2 8.2	—	—	C -864

■■ Grid #1 is control grid. Grid #2 is screen. Grid #3 tied to cathode
¶ Grid #1 is control grid. Grids #2 and #3 tied to plate.
● Grids #1 and #2 connected together. Grid #3 tied to plate.

RECTIFIERS

Maximum A-C Voltage per Plate……500 Volts, RMS Maximum D-C Output Current……250 Milliamperes	C -5Z3
Maximum A-C Voltage per Plate……250 Volts, RMS Maximum D-C Output Current…… 60 Milliamperes	C-12Z3
Maximum A-C Voltage per Plate……125 Volts, RMS Maximum D-C Output Current……100 Milliamperes	C-25Z5
Maximum A-C Voltage per Plate……350 Volts, RMS Maximum D-C Output Current…… 50 Milliamperes	C-1v°
A-C Voltage per Plate (Volts RMS): 350 400 550 D-C Output Current (Maximum MA.) 125 110 135 The 550 volt rating applies to filter circuits having an input choke of at least 20 henries.	C - 80
Maximum A-C Plate Voltage……700 Volts, RMS Maximum D-C Output Current…… 85 Milliamperes	CX-381
Maximum A-C Voltage per Plate……500 Volts, RMS Maximum D-C Output Current……125 Milliamperes Maximum Peak Inverse Voltage……1400 Volts Maximum Peak Plate Current…… 400 Milliamperes	C - 82
Maximum A-C Voltage per Plate……500 Volts, RMS Maximum D-C Output Current……250 Milliamperes Maximum Peak Inverse Voltage……1400 Volts Maximum Peak Plate Current…… 800 Milliamperes	C - 83
Maximum A-C Voltage per Plate……225 Volts, RMS Maximum D-C Output Current…… 50 Milliamperes	C - 84 *also 6Z4*
Maximum Peak Inverse Voltage……7500 Volts Maximum Peak Plate Current……0.6 Ampere	C -866 (CX-366)

PHOTOTUBES

Max. Anode Supply Voltage, 90 Volts. Max. Anode Current, 20 Microamperes. Static Sensitivity, 55 Microamperes per Lumen. Dynamic Sensitivity, 50 and 48 Microamperes per Lumen at 1000 and 5000 Cycles per second, respectively.	C -868

INDEX OF TYPES BY USE AND BY CATHODE VOLTAGE

DETECTORS	MIXER TUBES IN SUPERHETERODYNES	RECTIFIERS	CATHODE VOLTS
11, 12, 864	—	—	1.1
—	—	—	1.5
30, 32	1A6, 34	—	2.0
2A6, 2B7, 24-A, 27, 55, 56, 57	2A7, 35, 58	82, 866 (C-366)	2.5
'99	—	—	3.3
00-A, 01-A, '40, 112-A	—	5Z3, 80, 83	5.0
6B7, 6F7, 36, 37, 75, 77, 85	6A7, 6F7, 39-44, 78	1-v, 84	6.3
—	—	'81	7.5
—	—	12Z3	12.6
—	—	25Z5	25.0
—	—	—	30.0

Tube Symbols and Bottom Views of Socket Connections

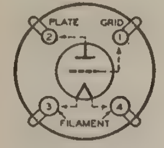


FIG. 1

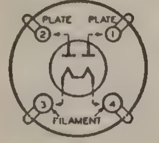


FIG. 2

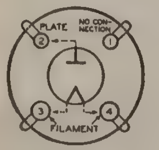


FIG. 3

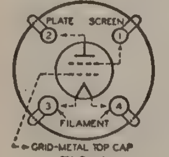


FIG. 4

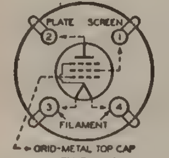


FIG. 4A

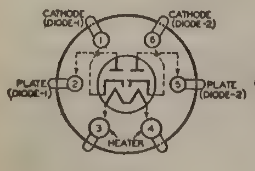


FIG. 5

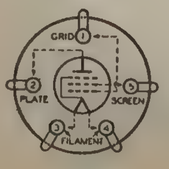


FIG. 6

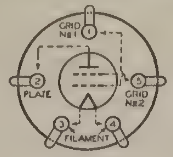


FIG. 7

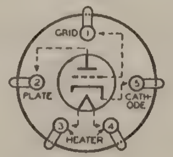


FIG. 8

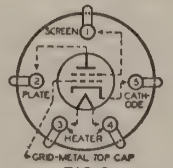


FIG. 9

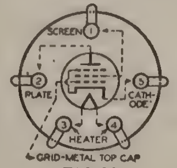


FIG. 9A

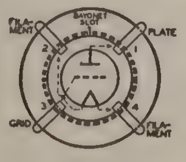


FIG. 10

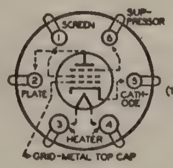


FIG. 11

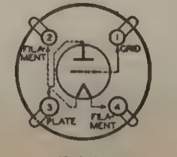


FIG. 12

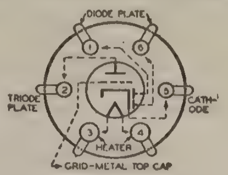


FIG. 13

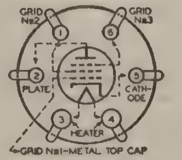


FIG. 14

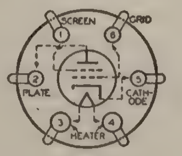


FIG. 15

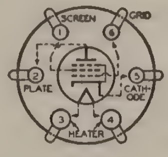


FIG. 15A

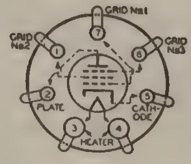


FIG. 18

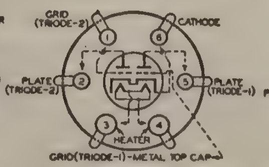


FIG. 19

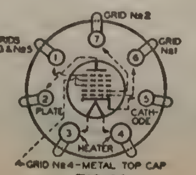


FIG. 20

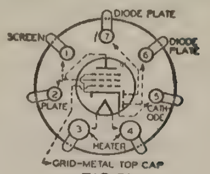


FIG. 21

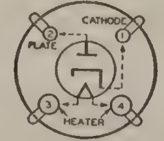


FIG. 22

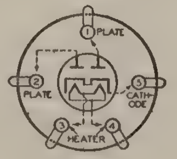


FIG. 23

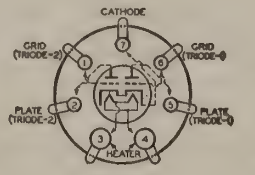


FIG. 24

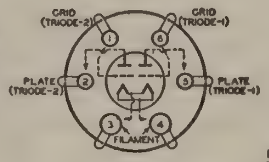


FIG. 25

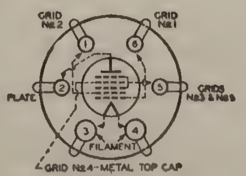


FIG. 26

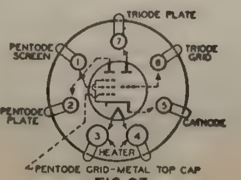


FIG. 27

Outline Dimensions of RCA Radiotron and Cunningham Radio Tube Types

This chart of tube dimensions is to be used in conjunction with the text. The bulb reference number for each tube is given under its CHARACTERISTICS.

The prefix letters of the bulb designation indicate the bulb shape; as S for "straight side," T for "tubular," ST for a combination of tubular and straight side, or "dome type." The suffix numbers of the bulb designations indicate the nominal maximum diameter of the bulb in eighths of inches, i.e., the diameter of the S-12 is 12 eighths, or 1½".

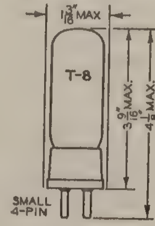


FIG. 1

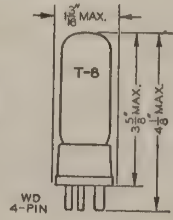


FIG. 2

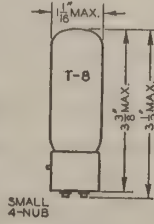


FIG. 3

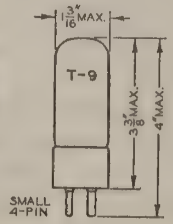


FIG. 4

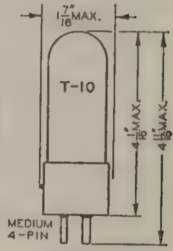


FIG. 5

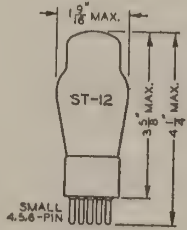
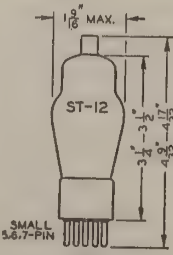
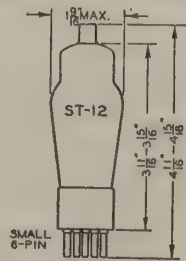


FIG. 6


$1\frac{9}{16}''$ MAX.
ST-12
$3\frac{1}{4}''-3\frac{1}{2}''$
$4\frac{9}{32}''-4\frac{17}{32}''$
SMALL 5,6,7-PIN
FIG. 7


$1\frac{9}{16}''$ MAX.
ST-12
$3\frac{11}{16}''-3\frac{15}{16}''$
$4\frac{11}{16}''-4\frac{15}{16}''$
SMALL 6-PIN
FIG. 8

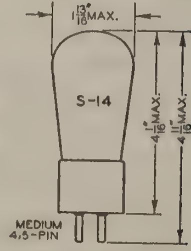


FIG. 9

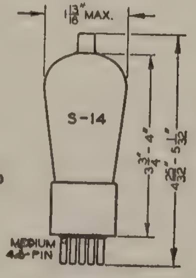


FIG. 10

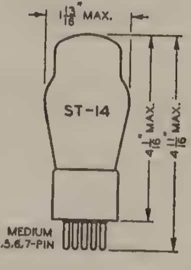


FIG. 11

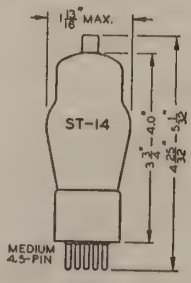


FIG. 12

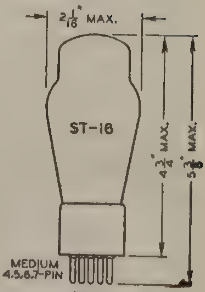


FIG. 13

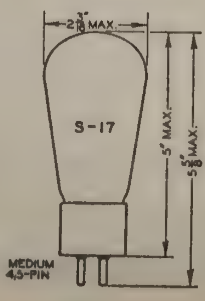


FIG. 14

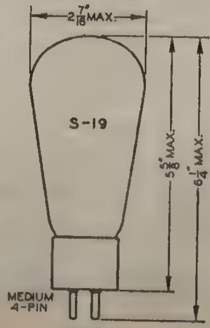


FIG. 15

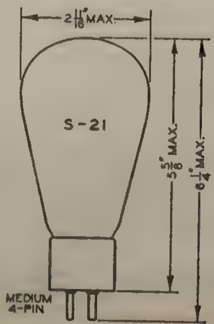
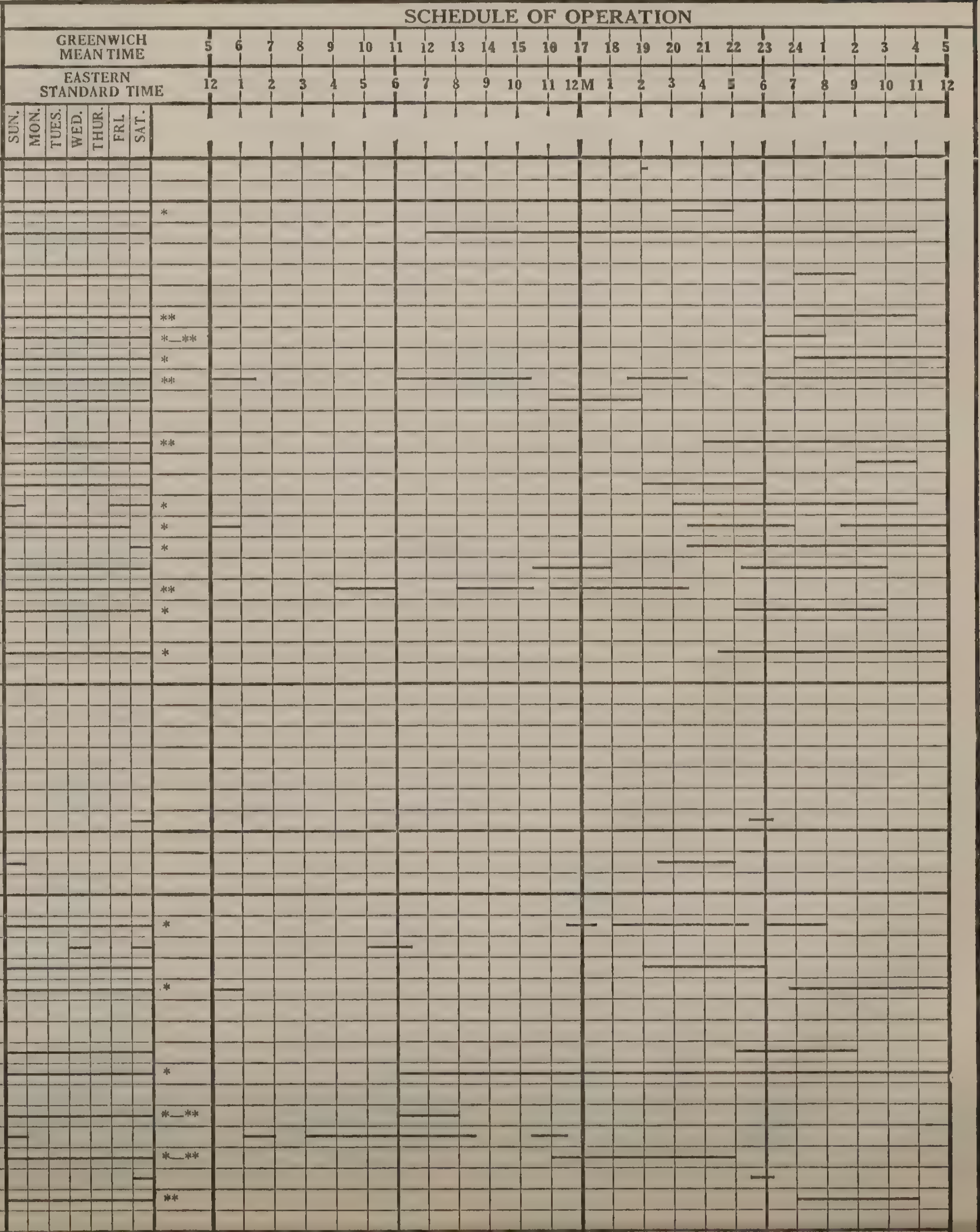


FIG. 16

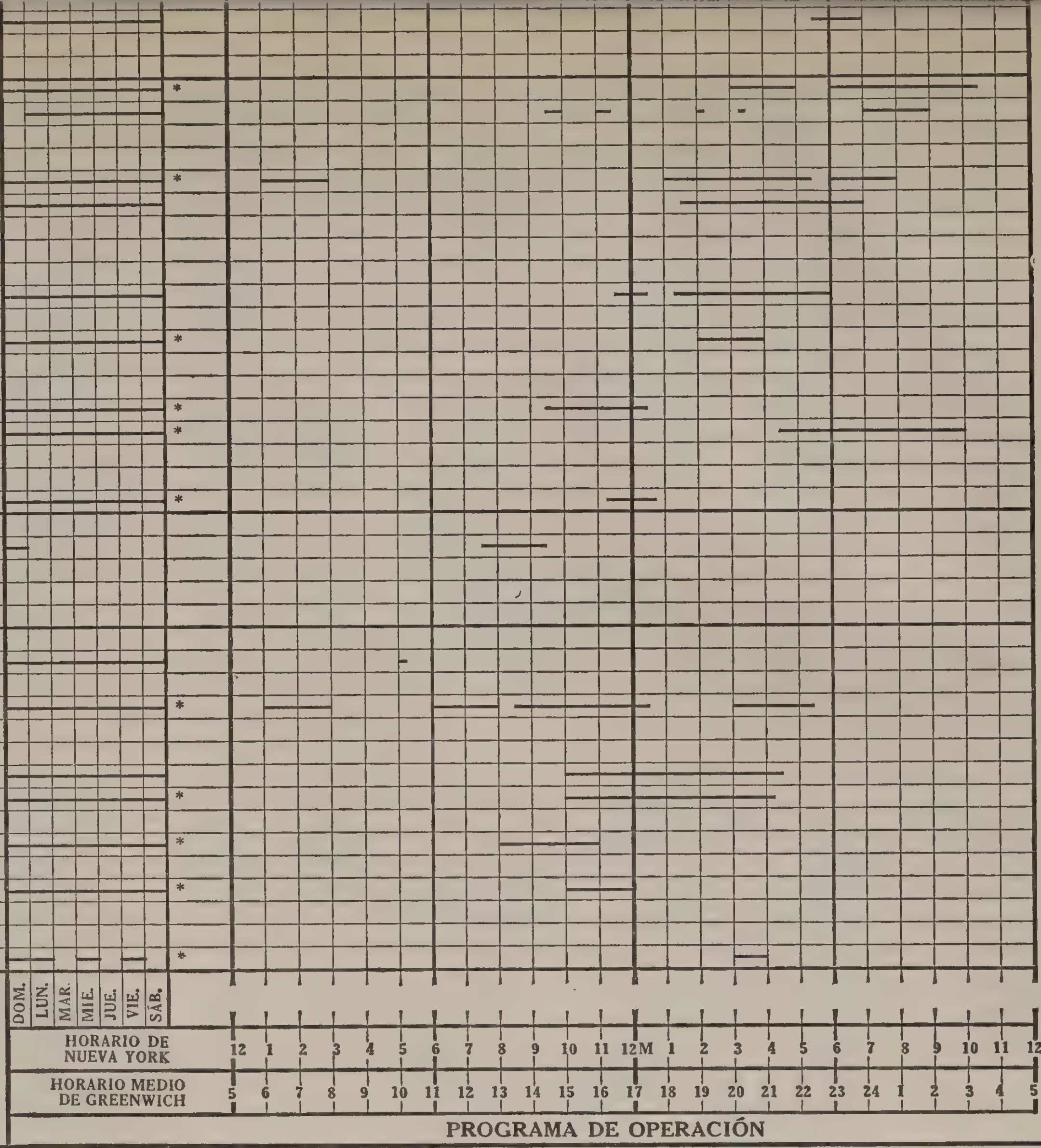
Short Wave Broadcasting Station List and Program Schedule

(Lista de Estaciones Difusoras de Onda Corta y Sus Programas de Operacíón)

BAND	STATION	WAVE LENGTH (METERS)	FREQUENCY (KILOCYCLES)	STATION LOCATION	POWER (KILOWATTS)	
	HVJ	50.21	5968	Vatican City	10	
49 M.	RV49	50.0	6000	Moscow, U. S. S. R.	20	*
	VE9DR	49.95	6005	Montreal, Canada	4	
	DJC	49.83	6020	Berlin, Germany	5	
	W4XB	49.67	6040	Miami, Fla., U. S. A.	2	**
	GSA	49.59	6050	London, England	20	*—**
	W3XAU	49.5	6060	Philadelphia, Pa., U. S. A.	1	*
	W8XAL	49.5	6060	Cincinnati, Ohio, U. S. A.	10	**
	VQ7LO	49.5	6060	Nairobi, Kenya, Africa	1	
	W9XAA	49.34	6080	Chicago, Ill., U. S. A.	½	**
	CP5	49.26	6090	La Paz, Bolivia	1	
	OXY	49.26	6090	Copenhagen, Denmark	½	
	VE9GW	49.22	6095	Toronto, Canada	1/5	*
	W9XF	49.18	6100	Chicago, Ill., U. S. A.	5	*
	W3XAL	49.18	6100	New York, N. Y., U. S. A.	35	*
	YV1BC	49.10	6110	Caracas, Venezuela	1/8	
	ZTJ	49.02	6120	Johannesburg, Africa	5	**
	W2XE	49.02	6120	New York, N. Y., U. S. A.	5	*
	W8XK	48.86	6140	Pittsburgh, Pa., U. S. A.	40	*
	Amateur	42.86–41.1	7000–7300	Mostly Code	1 (max.)	
	HBP	38.48	7797	Geneva, Switzerland	20	
	CNR	32.26	9300	Rabat, Morocco, Africa	12	
31 M.	GSB	31.55	9510	London, England	20	*
	VK3ME	31.55	9510	Melbourne, Australia	25	
	OXY	31.51	9520	Copenhagen, Denmark	½	
	W2XAF	31.48	9530	Schenectady, N. Y., U. S. A.	40	*
	DJA	31.38	9560	Berlin, Germany	5	
	W1XAZ	31.36	9570	Springfield, Mass., U. S. A.	10	*
	GSC	31.30	9585	London, England	20	*—**
	VK2ME	31.28	9590	Sydney, Australia	12	
	W3XAU	31.28	9590	Philadelphia, Pa., U. S. A.	1	*—**
	HBL	31.26	9595	Geneva, Switzerland	20	
	XETE	31.25	9600	Mexico City, Mexico	1	**



BANDA	ESTACIÓN	LONGITUD DE ONDA (METROS)	FRECUENCIA (KILOCICLOS)	SITUACIÓN DE LA ESTACIÓN	ENERGÍA (KILOVATIOS)	
	EAQ	30.43	9855	Madrid, Spain	20	
25 M.	FYA	25.64	11700	Paris, France	12	*
	VE9JR	25.62	11710	Winnipeg, Canada	2	
	GSD	25.53	11750	London, England	20	*
	DJD	25.51	11760	Berlin, Germany	5	
	I2RO	25.4	11810	Rome, Italy	9	
	W2XE	25.36	11830	New York, N. Y., U. S. A.	5	*
	GSE	25.29	11865	London, England	20	*
	W8XK	25.27	11870	Pittsburgh, Pa., U. S. A.	40	*
	FYA	25.21	11900	Paris, France	12	*
	CNR	23.38	12830	Rabat, Morocco, Africa	12	
	Amateur	21.2-21.1	14150-14250	Phone	1 (max.)	
19 M.	HVJ	19.84	15120	Vatican City	10	
	GSF	19.82	15140	London, England	15	*
	DJB	19.74	15200	Berlin, Germany	5	
	W8XK	19.72	15210	Pittsburgh, Pa., U. S. A.	40	*
	FYA	19.68	15240	Paris, France	12	*
	W2XE	19.64	15270	New York, N. Y., U. S. A.	5	*
	W2XAD	19.57	15330	Schenectady, N. Y., U. S. A.	25	*



*Station operates on a slightly different schedule during the summer months to comply with observance of "daylight-saving" time in the northern hemisphere. In general, schedules will be shifted one hour earlier during the period affected—such changes may be obtained most reliably through station announcement and may be noted upon the chart.

*Esta estación trabaja con un horario un poco diferente durante los meses de verano, de acuerdo con el horario de verano que se establece en el hemisferio del norte. En general los programas se adelantarán una hora durante el período indicado. Tales cambios pueden obtenerse con mayor seguridad por medio de los avisos procedentes de la estación respectiva, y estos cambios podrán anotarse en la Lista.

**Station operates irregularly at present—schedule shown therefore should be regarded as approximate.

**La estación trabaja ahora irregularmente y, por lo tanto, el horario indicado debe considerarse como aproximado.

NOTE—The stations listed are those having the greatest regularity of service. No guarantee can be made as to permanent accuracy of the data given. Blank spaces are left for inserting the local time and additional stations.

NOTA—Las estaciones que se indican son las que tienen un servicio de mayor regularidad. No se puede dar ninguna garantía con respecto a la exactitud permanente de los datos indicados. Se han dejado espacios en blanco para anotar el horario local y estaciones adicionales.

.0158

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instrucciones para el
Modelo R-3-B
(Receptor á Baterías)

INSTALACIÓN

Lugar para el Receptor—Coloque el instrumento cerca del lugar donde penetren en la habitación los hilos de antena y tierra y, si fuera posible, á donde alcanze el cable de las baterías las que pueden esconderse en una caja ó compartimento apropiado.

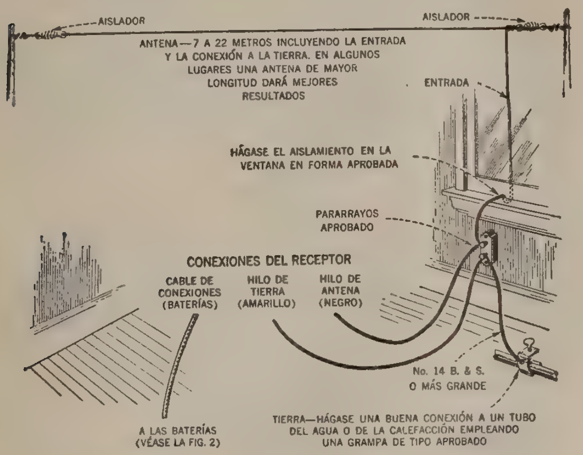

AISLADOR
AISLADOR
ANTENA—7 A 22 METROS INCLUYENDO LA ENTRADA Y LA CONEXIÓN A LA TIERRA. EN ALGUNOS LUGARES UNA ANTENA DE MAYOR LONGITUD DARÁ MEJORES RESULTADOS
ENTRADA
HÁGASE EL AISLAMIENTO EN LA VENTANA EN FORMA APROBADA
PARARRAYOS APROBADO
CONEXIONES DEL RECEPTOR
CABLE DE CONEXIONES (BATERÍAS)
HILO DE TIERRA (AMARILLO)
HILO DE ANTENA (NEGRO)
No. 14 B. & S. O MÁS GRANDE
A LAS BATERÍAS (VÉASE LA FIG. 2)
TIERRA—HÁGASE UNA BUENA CONEXIÓN A UN TUBO DEL AGUA O DE LA CALEFACCIÓN EMPLEANDO UNA GRAMPA DE TIPO APROBADO

Figura 1

Antena y Tierra—El sistema de antena que se recomienda aparece en el dibujo de la Figura 1. Es muy importante que se haga una buena conexión tanto á la antena como á la tierra, tal como aparece en el dibujo.

Baterías—Se necesitan las siguientes baterías:

Batería "A"—Se puede usar uno cualquiera de los siguientes tipos:

(1) Un acumulador de 2 voltios, o bien

(2) Seis pilas secas de 1½ voltios—Burgess No. 6, Eveready No. 7111, o su equivalente.

Batería "B"—Cuatro pilas secas de 45 voltios cada una. Se obtendrá el resultado más económico empleando las del tipo extra grande (llamadas de servicio pesado "heavy duty") tales como la Eveready No. 486 ó No. 870, la Burgess No. 21308, ó una equivalente.

Asegúrese que el Interruptor (Figura 3) se encuentra en la posición "desconectado." Conecte entonces las baterías tal como aparece en la Figura 2, (a) o (b), según sea el tipo de la batería "A" que se use.

Importante—Al usar una batería "A" de 3 voltios. según se demuestra en la Figura 2 (b), téngase cuidado de abrir el conectador entre los terminales 1 y 2 en la parte posterior del chasis. Al usar un acumulador de 2 voltios como en la Figura 2 (a), el conectador debe estar cerrado. La posición exacta del conectador se demuestra en la parte superior a la derecha de cada diagrama.

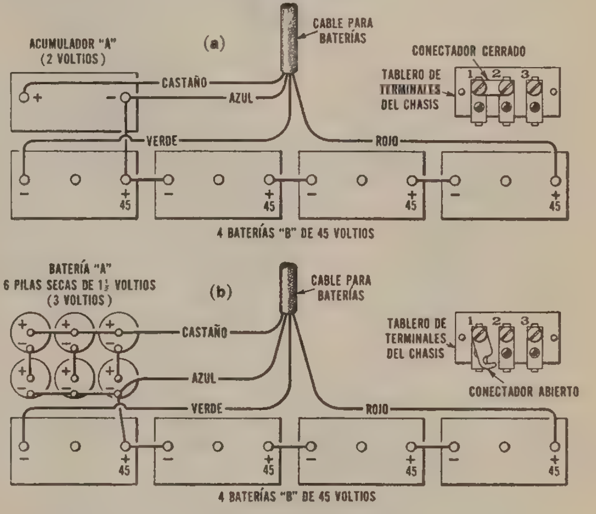

(a)
ACUMULADOR "A" (2 VOLTIOS)
CABLE PARA BATERÍAS
CONECTADOR CERRADO
TABLERO DE TERMINALES DEL CHASIS
1 2 3
CASTAÑO
AZUL
VERDE
ROJO
− + 45
4 BATERÍAS "B" DE 45 VOLTIOS
(b)
BATERÍA "A" 6 PILAS SECAS DE 1½ VOLTIOS (3 VOLTIOS)
CABLE PARA BATERÍAS
TABLERO DE TERMINALES DEL CHASIS
CONECTADOR ABIERTO
CASTAÑO
AZUL
VERDE
ROJO
4 BATERÍAS "B" DE 45 VOLTIOS

Figura 2

Radiotrons—Desempaque los tubos Radiotrons con cuidado é inserte cada uno en su respectivo "socket" ó portatubo de acuerdo con el dibujo-diagrama de los Radiotrons que se encuentra en la parte posterior del receptor. Coloque firmemente en su sitio cada una de las tres pantallas metálica tubulares encima de cada uno de los tres tubos Radiotrons de acuerdo con los círculos dobles que aparecen en el diagrama. Ahora conecte los tres hilos flexibles cortos que llevan pinzas en sus extremos libres al terminal superior ó del tope de los tubos RCA-32 y RCA-34 tal como se muestra en el diagrama.

MANEJO

Las perillas de manejo montadas en el tablero del frente del receptor aparecen en la Figura 3. Maneje el aparato como sigue:

1. Coloque el Interruptor en la posición "conectado," hacia la derecha.

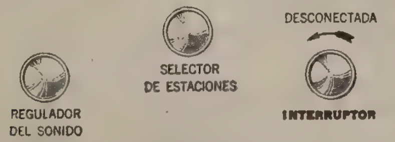


Figura 3

2. Avance la perilla del Regulador del Sonido hasta más ó menos la mitad de su carrera y haga girar lentamente la perilla de sintonización (ó Selector de Estaciones) hasta escuchar una estación. (El cuadrante de sintonización está calibrado y marcado en kilociclos para facilitar el hallar las estaciones cuya frecuencia de transmisión se conoce.) Si no capta ninguna estación avance un poco más el Regulador del Sonido hacia la derecha y repita la sintonización.

3. Una vez que ya se esté recibiendo una señal reduzca el volumen á un nivel bajo girando hacia la izquierda el Regulador del Sonido. Reajuste ahora el Selector de Estaciones con exactitud dejándolo en medio de aquellos dos puntos donde la señal desaparece ó donde la calidad de la reproducción comienza á sufrir. En esta posición se obtendrá la espléndida bondad de reproducción que es posible con este receptor.

4. Ahora ajústese el Regulador del Sonido de modo que se obtenga el volumen deseado.

5. Cuando se haya concluído de usar el receptor y no se quiera escuchar más vuelva á colocar el Interruptor en la posición "desconectado," hacia la izquierda.

NOTA—Muchas veces podrá mejorarse los resultados cambiando entre sí la posición de los Radiotrons de un mismo tipo.

Importante—Para evitar dañar los tubos Radiotron téngase cuidado de cortar la corriente, poniendo el interruptor en la posición "desconectado," antes de intercambiar entre sí ó retirar de sus "sockets" los tubos Radiotron. Obsérvese la misma precaución al cambiar ó instalar nuevas baterías.

Instructions for

Model R-3-B

(Battery Operated Receiver)

INSTALLATION

Location—Place the instrument near the antenna lead-in and ground connections and, if possible, where the battery cable will reach a compartment suitable for concealing the batteries.

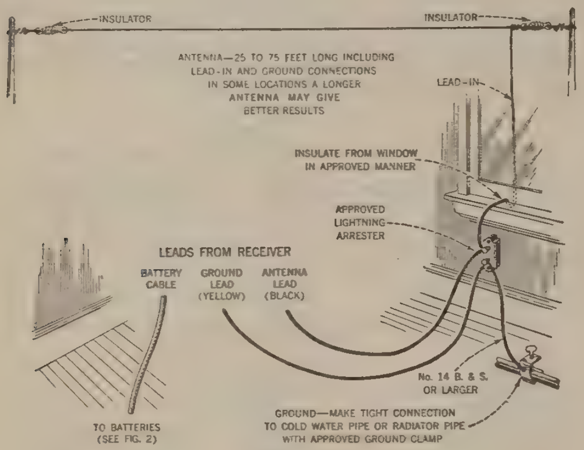

INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
APPROVED LIGHTNING ARRESTER
LEADS FROM RECEIVER
BATTERY CABLE
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
No. 14 B. & S. OR LARGER
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP
TO BATTERIES (SEE FIG. 2)

Figure 1

Antenna and Ground—The recommended antenna system is shown in Figure 1. It is important that a good ground connection be provided. Make connections to the antenna and ground as illustrated.

Batteries—The following batteries are required:

"A" Battery—Either of the following types may be used:

(1) One 2-volt storage cell; or

(2) Six 1½-volt dry cells—Burgess No. 6, Eveready No. 7111, or equivalent.

"B" Battery—Four 45 volt dry batteries. Most economical performance will be obtained by using the extra large (heavy duty) "B" batteries, such as Eveready No. 486 or 870, Burgess No. 21308, or equivalent.

Make certain that the On–Off Switch (Figure 3) is in the "off" position, counter-clockwise. Then connect the batteries as illustrated in Figure 2, (a) or (b), according to the type of "A" battery used.

Important—When using 3-volt "A" supply as shown in Figure 2 (b), be sure to open the link connecting terminals 1 and 2 on the rear of the chassis. For 2-volt "A" supply as in Figure 2 (a), the link should be closed. The proper link position is shown by the inset in each diagram.

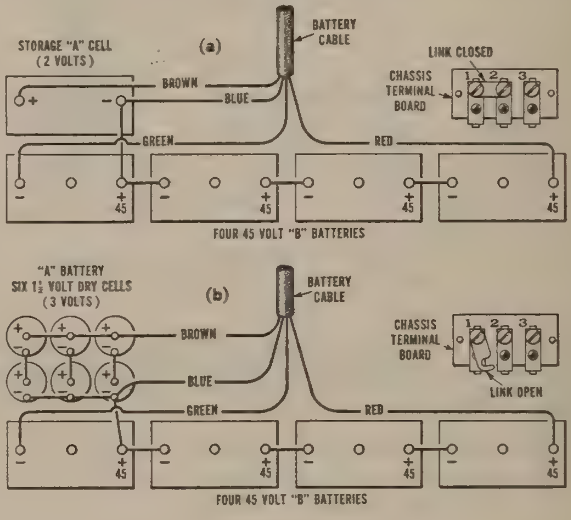


Figure 2

Radiotrons—Unpack the Radiotrons carefully and insert them in the proper sockets in accordance with the Radiotron diagram located on the rear of the receiver. Press the metal shields down firmly over the three Radiotrons shown by double circles on the diagram. Attach the three short flexible leads, equipped with spring contacts, securely to the top terminals of the RCA-32 and RCA-34 Radiotrons, as indicated on the Radiotron diagram.

OPERATION

The operating controls on the front panel are shown in Figure 3. Proceed as follows:

1. Set the On–Off Switch to the "on" position, clockwise.

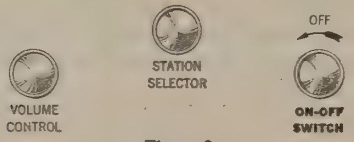


Figure 3

2. Advance the Volume Control about one-half turn from the extreme counter-clockwise position and turn the Station Selector in either direction until a station is heard. (The dial scale is calibrated in kilocycles to facilitate selecting stations of known frequency.) If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the selector.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. This setting provides the fine quality of reproduction possible with this instrument.

4. Adjust the Volume Control to obtain the desired volume.

5. When through operating, set the On–Off Switch to the "off" position, counter-clockwise.

NOTE—Improved performance may sometimes be obtained by interchanging Radiotrons of the same type in their respective sockets.

Important—To avoid damage to the Radiotrons, always set the On–Off Switch in the "off" position while interchanging or replacing Radiotrons, or while new batteries are being installed.

SERVICE DATA

Electrical Specifications

"A" Batteries Required........Two volt storage battery or series parallel connection of four No. 6 dry cells delivering 3 volts.

"B" Batteries Required..............Four 45 Volt Blocks, preferably of Heavy Duty type.

"A" Battery Current........................0.55 Ampere

"B" Battery Current (Max. Volume Control)..0.032 Ampere

Type and Number of Radiotrons...............2 RCA-234, 1 RCA-232, 2 RCA-230, 1 RCA-233—Total, 6.

Undistorted Output............................0.4 Watt

This battery model Super-Heterodyne receiver incorporates such features as low current consumption Radiotrons, single Pentode output stage and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers. Line-up adjustments are made with a modulated oscillator and output meter. The I. F. amplifier uses one tuned and one untuned transformer. The I. F. frequency is 175 K. C. and the line-up capacitors should be adjusted for maximum output at this frequency. The three gang capacitor trimmers are adjusted for maximum output when the dial is set at 1410 K. C. and the oscillator at 1400 K. C.

Figure A shows the schematic diagram while Figure B shows the chassis wiring.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2012	Capacitor—1,200 mmfd.—Connected from second detector plate to ground..........	$0.55
2532	Capacitor—230 mmfd.—Located on resistor board—Package of 5....................	2.50
2747	Cap—Contact cap—Package of 5..........	.50
2963	Resistor — 8,000 ohms — Carbon type — 1 watt—Package of 5....................	1.10
2994	Coil—Located on resistor board...........	.45
3076	Resistor — 1 megohm — Carbon type — ½ watt—Package of 5................	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
3079	Resistor — 40,000 ohms — Carbon type — ½ watt—Package of 5................	1.00
3118	Resistor — 100,000 ohms — Carbon type — ¼ watt—Located on R. F. coil—Package of 5..................................	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
3297	Resistor—80,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt—Package of 5..................	1.00
3368	Socket—UX type Radiotron socket.........	.40
3382	Resistor — 750 ohms — Carbon type — ½ watt—Package of 5....................	1.00
3456	Capacitor—0.05 mfd........................	.44
3460	Capacitor—1,200 mmfd.—Connected across plate and filament of second detector......	.30
3471	Capacitor—0.025 mfd.—Connected in series with 10,000 ohms resistor across primary of output transformer....................	.32
3509	Socket—Five contact Radiotron socket......	.36
3510	Shaft—Tuning condenser drive shaft........	.46
3511	Scale—Dial scale and drum..................	.46
3512	Switch—Operating switch—3 pole—Single throw rotary type....................	1.50
3513	Capacitor—700 mmfd.—Located on detector oscillator coil......................	.48
3515	Resistor — 1,800 ohms — Carbon type — ½ watt—Package of 5..................	$1.00
6142	Resistor — 6,000 ohms — Carbon type — ½ watt—Package of 5..................	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
6249	Resistor—1.5 ohms—Flexible type—Package of 5................................	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
6333	Cable—4 conductor—Braid covered cable—Connected to operating switch..........	.70
6414	Capacitor pack—Comprising one 1.0 mfd., two 0.75 mfd. and two 0.1 mfd. capacitors in metal container......................	2.36
6415	Transformer assembly—Comprising interstage and output transformer in metal container................................	3.84
6416	Transformer—First intermediate frequency transformer............................	2.18
6417	Transformer — Second intermediate frequency transformer....................	2.02
6418	Coil—Detector oscillator coil...............	2.40
6419	Coil—R. F. coil............................	1.04
6463	Volume control—Complete with mounting nut..................................	1.25
7241	Condenser—3 gang variable tuning condenser assembly........................	4.00
	LOUDSPEAKER ASSEMBLY	
2975	Rivet—Cone retaining ring mounting rivet —Package of 100........................	.50
6166	Board—Terminal board with two terminals —Located on cone bracket—Package of 5.	1.00
8983	Magnet assembly—Comprising cone bracket core and magnet..........................	5.52
8984	Cone—Speaker paper cone—Package of 5...	6.25

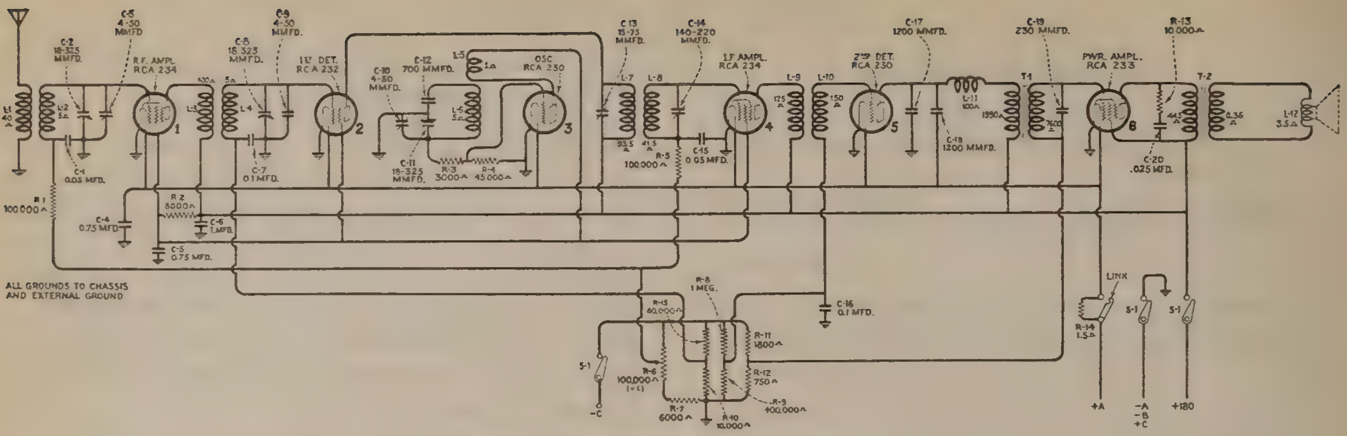


Figure A—Schematic Circuit Diagram

RADIOTRON SOCKET VOLTAGES

Voltages measured at maximum volume control and no signal impressed on input

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current, M. A.	Filament or Heater, Volts
1. R. F. RCA-234	2.5	70	135	4.25	2.0
2. 1st Detector RCA-232	5.0	70	135	1.0	2.0
3. Oscillator RCA-230	—	—	70	4.5	2.0
4. I. F. RCA-234	2.5	70	135	4.25	2.0
5. 2nd Detector RCA-230	13.0	—	130	0.3	2.0
6. Power RCA-233	11.0	135	130	15.0	2.0

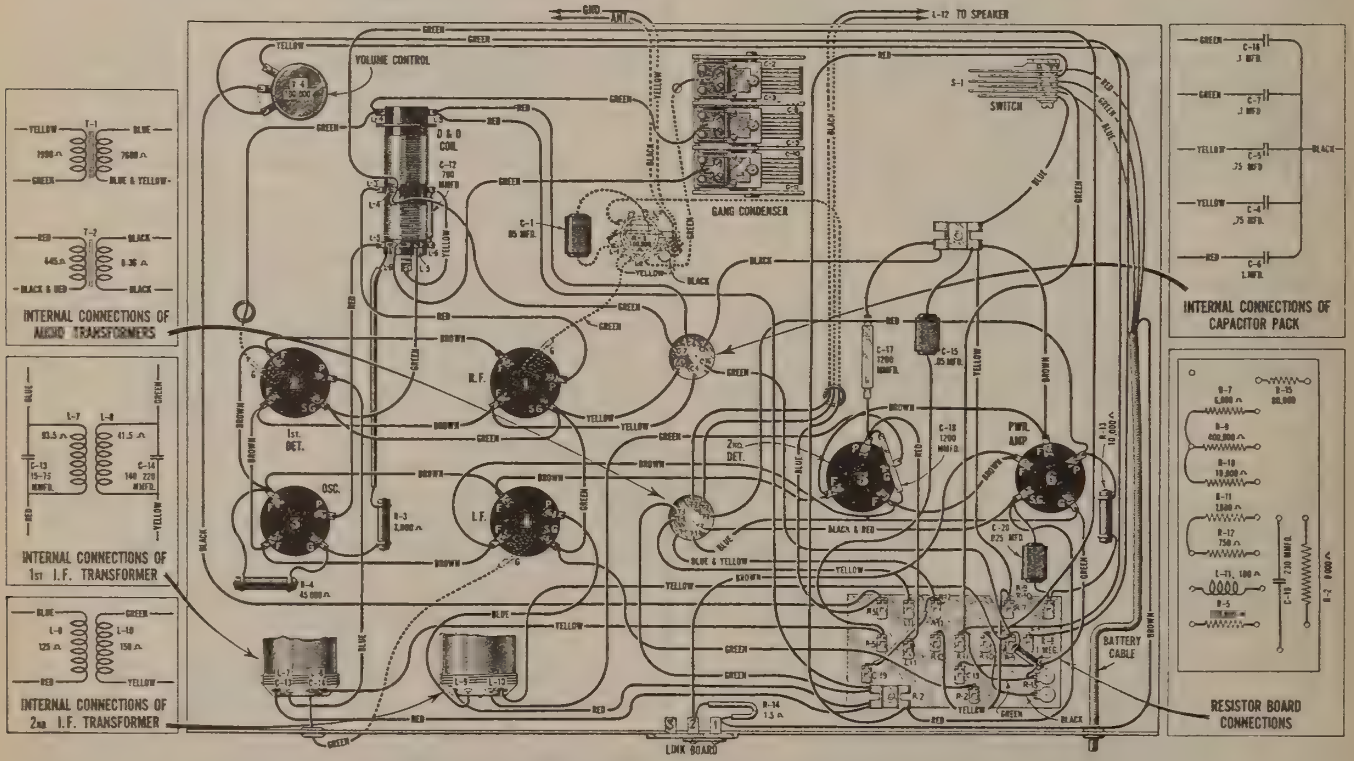

GRD
ANT
L-12 TO SPEAKER
VOLUME CONTROL
D & O COIL
GANG CONDENSER
S-1 SWITCH
R.F.
1st. DET.
OSC.
I.F.
2nd. DET.
PWR. AMP.
LINK BOARD
BATTERY CABLE
INTERNAL CONNECTIONS OF AUDIO TRANSFORMERS
INTERNAL CONNECTIONS OF 1st I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 2nd I.F. TRANSFORMER
INTERNAL CONNECTIONS OF CAPACITOR PACK
RESISTOR BOARD CONNECTIONS

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Figure B—Wiring Diagram

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23065

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Instrucciones para el

Modelo R-3-C

(Corriente Continua, 200/230 Voltios)

Preliminar—Remuévase la parte de atrás del mueble que está sostenida en su lugar por medio de tornillos. *No se haga la conexión del instrumento al enchufe mientras el instrumento esté sin su parte de atrás.* Remuévase el material de empaque de los Radiotrons. Cerciórese de que los Radiotrons estén en sus enchufes respectivos según ilustración en la etiqueta en el chasis del radio. La colocación de los Radiotrons ha de hacerse estrictamente de acuerdo con las instrucciones para evitar que se dañen.

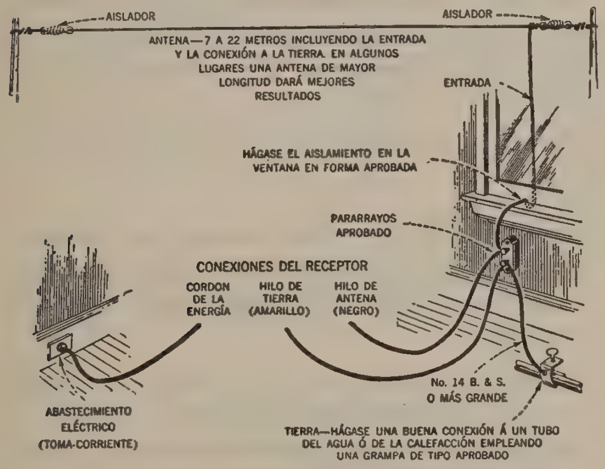
AISLADOR
AISLADOR
ANTENA—7 A 22 METROS INCLUYENDO LA ENTRADA Y LA CONEXIÓN A LA TIERRA. EN ALGUNOS LUGARES UNA ANTENA DE MAYOR LONGITUD DARÁ MEJORES RESULTADOS
ENTRADA
HÁGASE EL AISLAMIENTO EN LA VENTANA EN FORMA APROBADA
PARARRAYOS APROBADO
CONEXIONES DEL RECEPTOR
CORDON DE LA ENERGÍA
HILO DE TIERRA (AMARILLO)
HILO DE ANTENA (NEGRO)
No. 14 B. & S. O MÁS GRANDE
ABASTECIMIENTO ELÉCTRICO (TOMA-CORRIENTE)
TIERRA—HÁGASE UNA BUENA CONEXIÓN Á UN TUBO DEL AGUA Ó DE LA CALEFACCIÓN EMPLEANDO UNA GRAMPA DE TIPO APROBADO

Figura 1

Apriétense firmemente forzándolas hacia abajo las cubiertas protectoras de los Radiotrons señalados por circulos dobles y téngase la completa seguridad de que los tres hilos cortos, flexibles, hayan sido debidamente recortados y ajustados firmemente a los terminales superiores de los Radiotrons RCA-39, según indicaciones que aparecen en la etiqueta de licencia. Vuélvase a colocar la parte de atrás del mueble.

Colocación—Colóquese el instrumento a una distancia conveniente de un enchufe y cerca del alambre de entrada de la antena y de las conexiones de contacto con tierra.

Conexiones—La Figura 1 indica las conexiones externas y el sistema de antena que se recomienda. Es indispensable que se obtenga una buena conexión a tierra. Háganse las conexiones con la antena y tierra en la forma que se ilustra.

Conéctese el cable de la energía del instrumento a una fuente abastecedora de corriente continua dentro de los límites de voltaje especificados en la etiqueta de licencia.

Importante—*Este receptor no funcionará salvo que las espigas del tapón conector sean insertadas en el enchufe en su posición apropiada. La posición correcta ha de hallarse haciendo ensayos.*

Funcionamiento—Refiriéndose a la Figura 2 procédase del modo siguiente:

1. Colóquese el Interruptor en la posición "on" (conectado) hacia la derecha. Varios segundos han de transcurrir para que los Radiotrons se calienten antes que el instrumento empiece a funcionar satisfactoriamente.

2. Colóquese el Regulador del Sonido en poco más o menos el punto medio de su alcance. Luego hágase girar el Selector de Estaciones hacia la izquierda o hacia la derecha hasta que se capte una estación. (La escala del cuadrante está calibrada en kilociclos para facilitar la selección de estaciones que perifonean a una frecuencia conocida.) Si no se ha podido sintonizar ninguna estación, adelántese el Regulador del Sonido hacia la derecha y repítase este medio de sintonizar.

3. Después de haber logrado captar a alguna estación, hágase girar el Regulador del Sonido hacia la izquierda hasta que el sonido quede algo reducido. Luego reajústese el Selector de Estaciones hasta que se obtenga un sonido máximo (con lá graduación correspondiente del Regulador del Sonido). Ajústese el Regulador del Sonido de modo que se obtenga el sonido deseado.

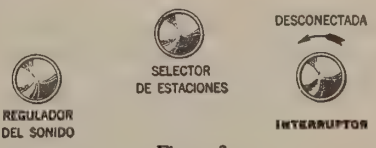

Figura 2

4. Cuando se desee que el instrumento cese de funcionar, colóquese el Interruptor en la posición "off" (desconectado) hacia la izquierda.

Instructions for

Model R-3-C

(200/230 Volts D. C.)

Preliminary—Remove the rear cover which is held by screws. *Do not connect the instrument to the electrical outlet while the back is off.* Remove the packing material from the Radiotrons. Make certain that the Radiotrons are in their proper sockets as illustrated on the rating label on the radio chassis. The arrangement shown must be followed exactly to avoid damage to the Radiotrons.

Press the shield covers down firmly over the Radiotrons shown by double circles, and make sure that the three short flexible leads are clipped securely to the top terminals of the RCA-39 Radiotrons as indicated on the rating label. Replace the rear cover.

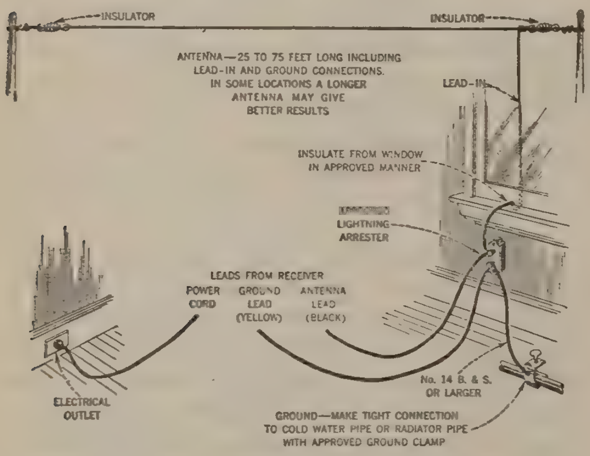
INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS. IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
[redacted]
LIGHTNING ARRESTER
LEADS FROM RECEIVER
POWER CORD
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
No. 14 B. & S. OR LARGER
ELECTRICAL OUTLET
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

Location—Place the instrument near a convenient electrical outlet and near the antenna lead-in and ground connections.

Connections—Figure 1 shows the external connections and the recommended antenna system. A good ground connection is important. Make connections to the antenna and ground as illustrated.

Connect the instrument power cord to an electrical outlet supplying direct current within the voltage limits specified on the license label.

Important—*This receiver will not operate unless the prongs of the attachment plug are inserted in the outlet in the proper position. The correct position must be determined by trial.*

Operation—Refer to Figure 2, and proceed as follows:

1. Set the On-Off Switch to the "on" position, clockwise. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

2. Set the Volume Control at about the middle of its range. Then turn the Station Selector in either direction until a station is heard. (The dial scale is calibrated in kilocycles to facilitate selecting stations of known frequency.) If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is somewhat reduced. Now readjust the Station Selector until maximum volume (with this setting of the Volume Control) is obtained. Adjust the Volume Control to secure the desired volume.

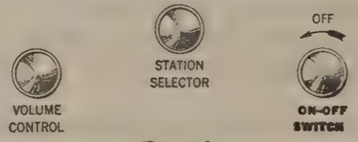

Figure 2

4. When through operating, set the On-Off Switch to the "off" position, counter-clockwise.

SERVICE DATA

Electrical Specifications

Voltage Rating..............................200–230 Volts
Power Consumption..............................115 Watts
Radiotrons Required
3 RCA-39, 2 RCA-37, 1 RCA-89—Total 6
Undistorted Output..............................0.7 Watt
Intermediate Frequency..............................175 K. C.
R. F. and Oscillator Line-up Frequency.....1400 K. C. Only

This receiver is a six tube Super-Heterodyne receiver designed for use on 200–230 volt direct current power lines. Features such as low current Radiotrons, Pentode Output Stage and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are features of this receiver.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers. Line-up adjustments are made with a modulated oscillator and output meter. The I. F. amplifier uses one untuned transformer and one tuned transformer. The I. F. frequency is 175 K. C. and the line-up capacitors should be adjusted for maximum output at this frequency. The three gang capacitor trimmers are adjusted for maximum output when the dial and oscillator are both set at 1400 K. C.

Figure A shows the schematic wiring and Figure B the chassis wiring. The voltage readings and the replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Heater or Filament, Volts	Radiotron Socket Voltages
1. R. F. RCA-39	3.5	90	205	5.0	6.0	
2. 1st Detector RCA-39	10	83	200	1.0	6.0	
3. Oscillator RCA-37	—	—	90	4.5	6.0	
4. I. F. RCA-39	3.5	90	205	5.0	6.0	
5. 2nd Detector RCA-37	20	—	185	.75	6.0	
6. Power RCA-89	18.5	190	180	15.0	6.0	

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2532	Capacitor—230 mmfd.—Package of 5........	$2.50
2731	Resistor — 10,000 ohms — Carbon type — 1 watt—Package of 5....................	1.10
2746	Socket—Pilot lamp socket..................	.20
3076	Resistor — 1 megohm — Carbon type — ½ watt—Package of 5....................	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
3384	Capacitor—650 mmfd.—Located on detector and oscillator coil—Package of 5..........	1.50
3461	Coil—Second detector plate choke coil......	.88
3471	Capacitor—0.025 mfd....................	.32
3472	Capacitor—0.0024 mfd....................	.32
3517	Switch—Double pole—Single throw.........	1.50
3518	Shaft—Tuning condenser drive shaft........	.50
3519	Resistor — 9,000 ohms — Carbon type — 3 watts....................................	.25
3520	Resistor—Porcelain type—Wire wound—322 ohms—Tapped at 22 ohms..........	.88
3566	Socket—Radiotron 5 contact socket.........	.50
3608	Resistor—720 ohms—Carbon type—1 watt—Package of 5..........................	1.10
6142	Resistor — 6,000 ohms — Carbon type — ½ watt—Package of 5....................	1.00
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5....................	1.00
6421	Transformer—Audio transformer assembly—Comprising interstage and output transformer in metal container.................	3.68
6422	Capacitor assembly—Comprising two 4.0 mfd., two 0.5 mfd., one 0.25 mfd., one 0.1 mfd. and one 0.05 mfd. capacitors in metal container..................................	$4.04
6423	Transformer—First intermediate frequency transformer..............................	2.84
6424	Transformer—Second intermediate frequency transformer.........................	2.20
6425	Coil—Detector and oscillator coil..........	2.65
6426	Coil—R. F. coil...........................	.95
6427	Scale—Dial scale and drum.................	.50
6428	Resistor — Porcelain type — 995 ohms — Tapped at 290 ohms....................	.80
6468	Volume control—Complete with mounting nut..	1.25
7054	Cord—Power cord.........................	.60
7241	Condenser—3 gang variable tuning condenser assembly........................	4.00
7485	Socket—Radiotron 6 contact socket.........	.40
7496	Shield—Radiotron tube shield..............	.25
7518	Reactor—Filter reactor....................	2.30
	REPRODUCER ASSEMBLIES	
3005	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets............	.50
6184	Board—Terminal board with three terminals—Package of 5..........................	.50
7442	Cone—Reproducer cone complete—Package of 5....................................	5.00
8702	Ring—Cone retaining ring.................	.50
8977	Coil assembly—Comprising field coil, cone bracket and magnet.....................	3.35

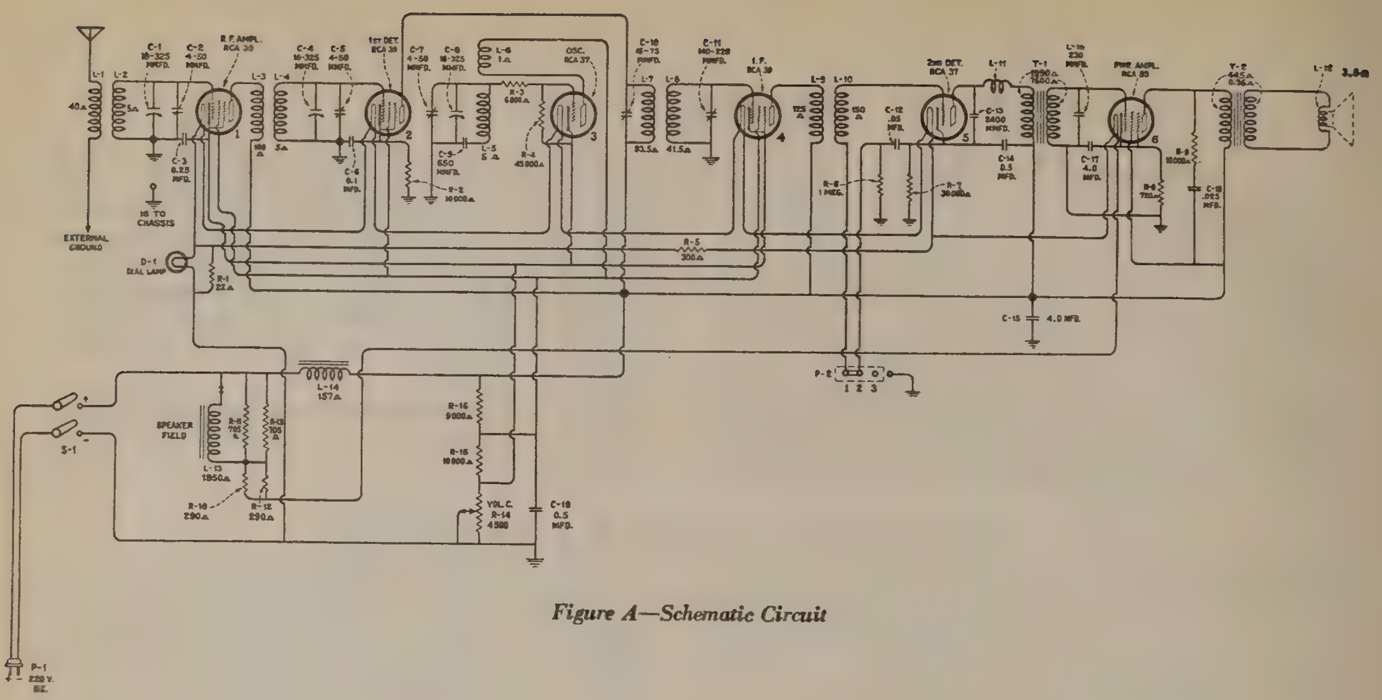

Figure A—Schematic Circuit

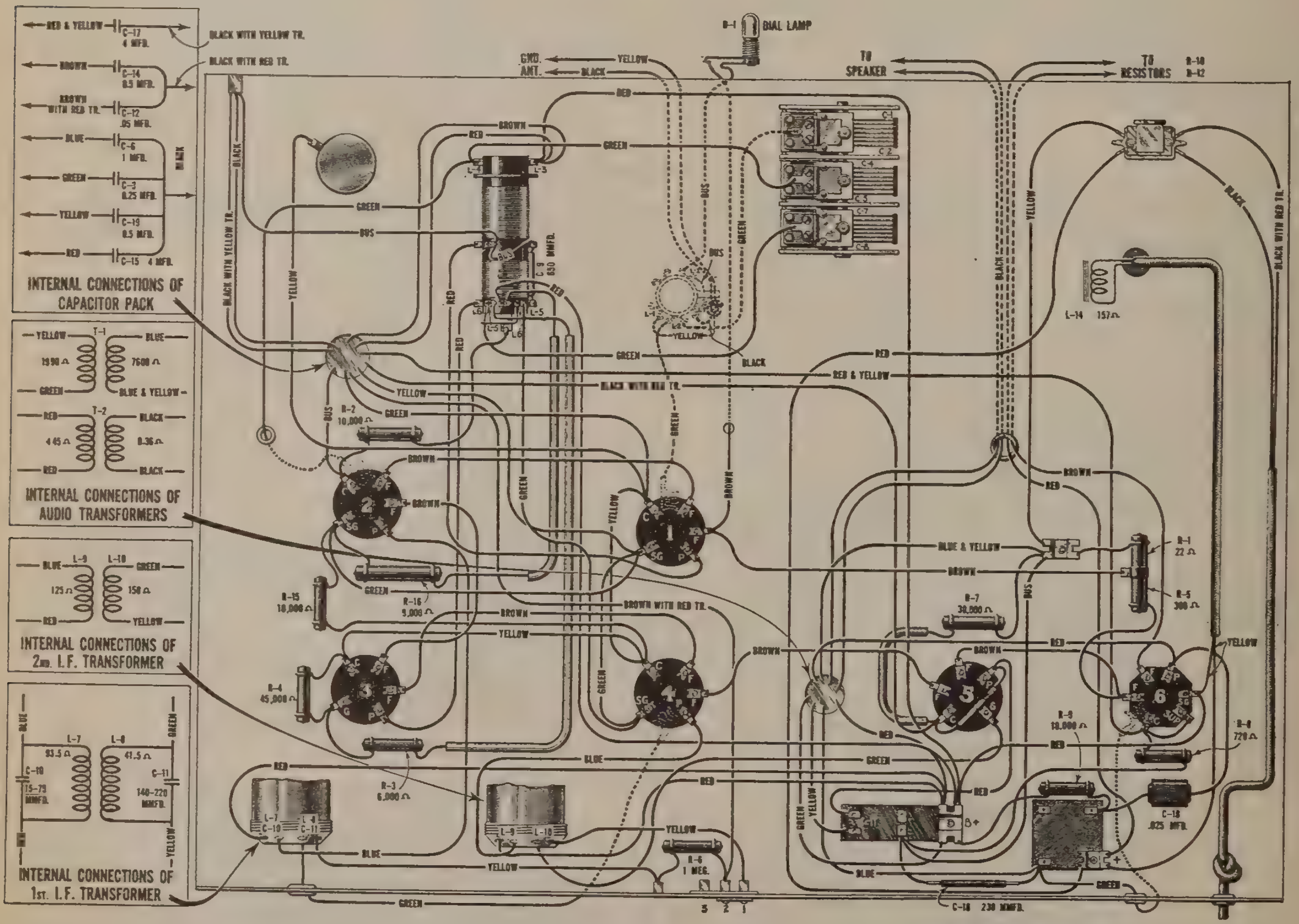

Figure B—Chassis Wiring Diagram

C-13 2400 MMFD. CONNECTED FROM SOCKET NO. 5C TOP]

.0542

RCA Victor Company, Inc.
Camden, N. J., U. S. A.

12150

Printed in U. S. A.

RCA Victor

Short Wave Converter SW-3

SERVICE NOTES

RCA Victor R-24 with SW-3 Converter

[First Edition—5M
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SERVICE DIVISION

RCA Victor Company, Inc.

Camden, N. J., U. S. A.

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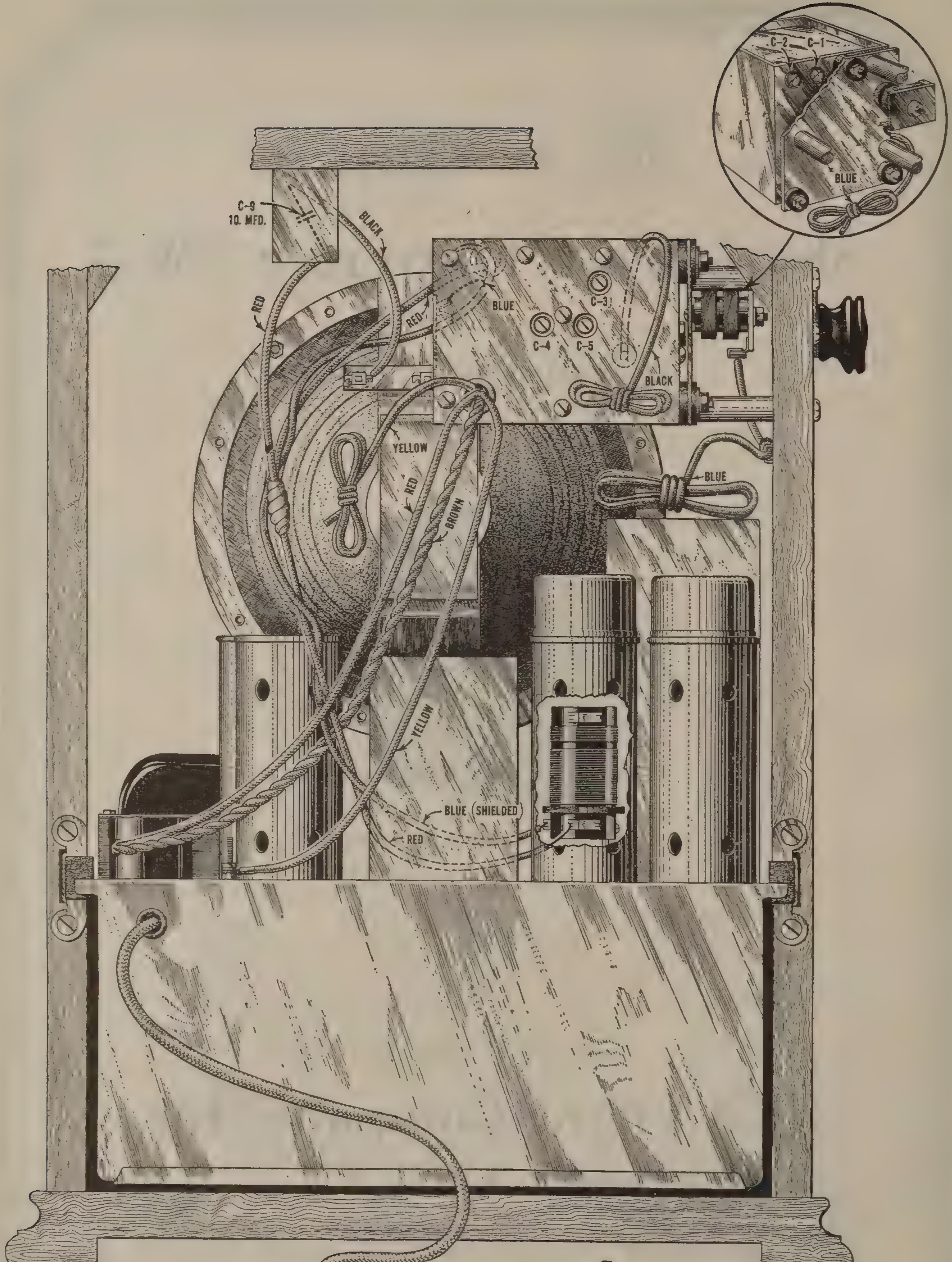
REPRESENTATIVES IN PRINCIPAL CITIES



(Some Models have Converter Unit on the opposite side from that shown)

Figure 1—Assembly Wiring of Model R-24

RCA Victor
Short Wave Converter SW-3

SERVICE NOTES

SPECIFICATIONS

Type of Circuit.............Super-Heterodyne Converter for use with standard broadcast receiver

Type and Number of Radiotrons—A. C...........................1 RCA-58, 1 RCA-56—Total, 2

Type and Number of Radiotrons—Battery....................1 RCA-230, 1 RCA-232—Total, 2

Type of Tuning....All tuning is done by means of the I. F. Amplifier, which is the broadcast receiver

Broadcasting Ranges.................................

6000 K. C. to 6150 K. C.—49 Meters
9500 K. C. to 9600 K. C.—31 Meters
11700 K. C. to 11900 K. C.—25 Meters
15100 K. C. to 15350 K. C.—19 Meters

Requirements of Receiver for use with Converter......................High impedance antenna transformer primary insulated from the chassis or other circuits; a source of 2.5 volt current capable of supplying 2 amperes additional and a source of 180–260 volt plate current supplying an additional 5 M. A. The cabinet must also be acoustically correct, as the tendency to howl is increased by the addition of the converter.

The RCA Victor Short Wave Converter SW-3 is a two-tube Super-Heterodyne Converter that may be used with standard broadcast band receivers. By means of the Converter, short wave broadcasting stations may be received merely by tuning with the broadcast receiver. A selector switch allows choice of the short wave band that it is desired to receive.

A number of RCA Victor receivers include this Converter. The assembly wiring diagrams, together with any schematic changes for the models, are contained in this booklet. The regular Service Notes should be consulted for service information pertinent to the broadcast receivers.

SERVICE DATA

A three-section, five-position switch, located on the side or front of the cabinet, provides for readily changing the detector fixed tuning inductance and the oscillator fixed tuning capacitance (both in the short wave converter) for operation in any desired short wave broadcasting band. Such changes are effected by shifting the tap switch contact arm through its first four positions, the fifth, or remaining position, being employed for standard (long wave) broadcast reception. In the latter case, the short wave circuits are isolated and grounded and the incoming signals are transferred to the input of the standard broadcast receiver.

The following tabulation shows the frequency range of the instrument for each position of the switch and, in addition, the width of the important short wave bands included in those ranges:

Switch Position	*Range (K. C.)*	*Broadcast Band Included (Meters)*	*Band Width (K. C.)*
1	15600–14650	19	15340–15100
2	12350–11400	25	11900–11700
3	9950– 9000	31	9600–9500
4	6700– 5750	49	6150–6000
5	1500– 550	Standard	1500–550

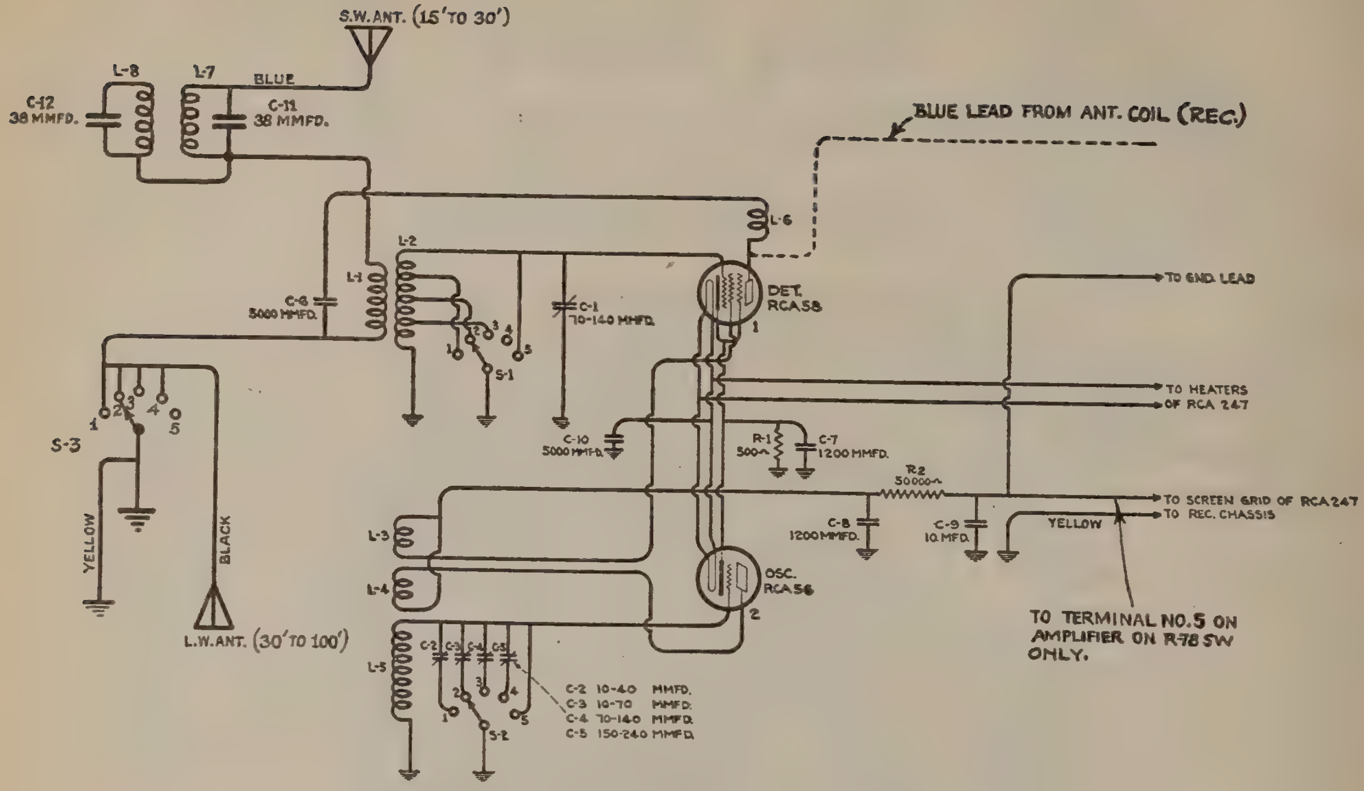


Figure 2—Schematic Diagram of A. C. SW-3

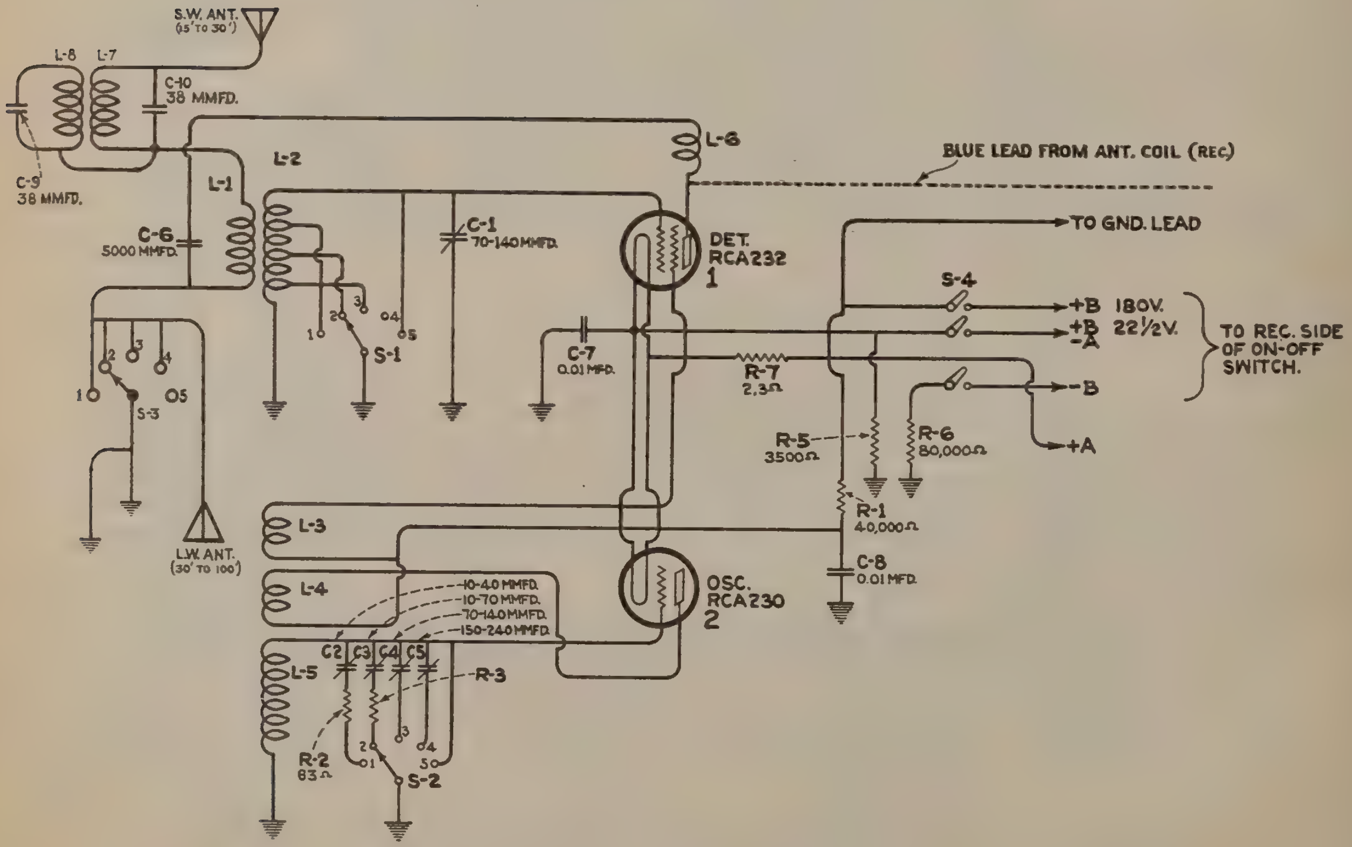


Figure 3—Schematic Diagram of Battery SW-3

By examination of the above table, it will be seen that considerable latitude is provided on either side of the actual extremities of each standardized short wave band. This provision further increases the usefulness of the receiver since several stations are now operating on frequencies slightly outside of the actual band range limits.

Since all tuning adjustments are effected from the single dial, it will be appreciated that considerable interference with short wave reception may be caused by nearby, powerful, long wave (200 to 546 meter) broadcasting stations. Since when correctly adjusted, all short wave broadcasting bands fall within 950–1300 K. C., the possibility of interference is limited to that caused by local stations operating within these frequencies. Such interference may be eliminated in each range by a slight shift of the oscillator frequency. This result is accomplished by adjustment of one of the four, spring-plate, tuning capacitors on the short wave converter chassis, one of which is effective for each position of the tap switch. Any adjustment of these capacitors, of course, will change the dial positions of all stations in that particular range an equal number of dial divisions (10 K. C. per dial division) to an extent corresponding to the frequency shift from the original position at which interference was encountered. If local stations are present within 950–1300 K. C. range, adjust the oscillator tuning capacitors so that no short wave signals are received at the same dial setting.

(1) OSCILLATOR ADJUSTMENTS

The oscillator frequencies should be the following values for the taps indicated:

Band	*Oscillator Frequency*	*Trimming Capacitor*
19 Meter	14100 K. C.	C-2
25 Meter	12900 K. C.	C-3
31 Meter	8450 K. C.	C-4
49 Meter	7250 K. C.	C-5

If a frequency meter or a calibrated receiver is available, either will be suitable for checking or adjusting these capacitors. If such equipment is not available then the following method may be used:

The frequency of the oscillator may be checked by adding or subtracting the dial reading in kilocycles from the operating frequency of the station being received. The instruction book lists a number of stations with their correct operating frequency. The dial reading should be added or subtracted as follows:

19 Meter Tap..........Subtract dial reading.
25 Meter Tap..........Add dial reading.
31 Meter Tap..........Subtract dial reading.
49 Meter Tap..........Add dial reading.

It will be noted that when the oscillator trimmer capacitors are properly adjusted, all stations operating in the assigned bands will fall between 950 and 1300 K. C. on the receiver dial. The purpose of the oscillator capacitors is to adjust this range and is *not* a sensitivity adjustment.

In the event that they are so badly out of adjustment that one or more of the bands fall entirely out of the receiver tuning range and no short wave broadcasting stations are heard, the following procedure may be used for realigning them:

1. By means of a set using the SW-3 Converter and working properly, determine that a station can be heard on the band to be adjusted.

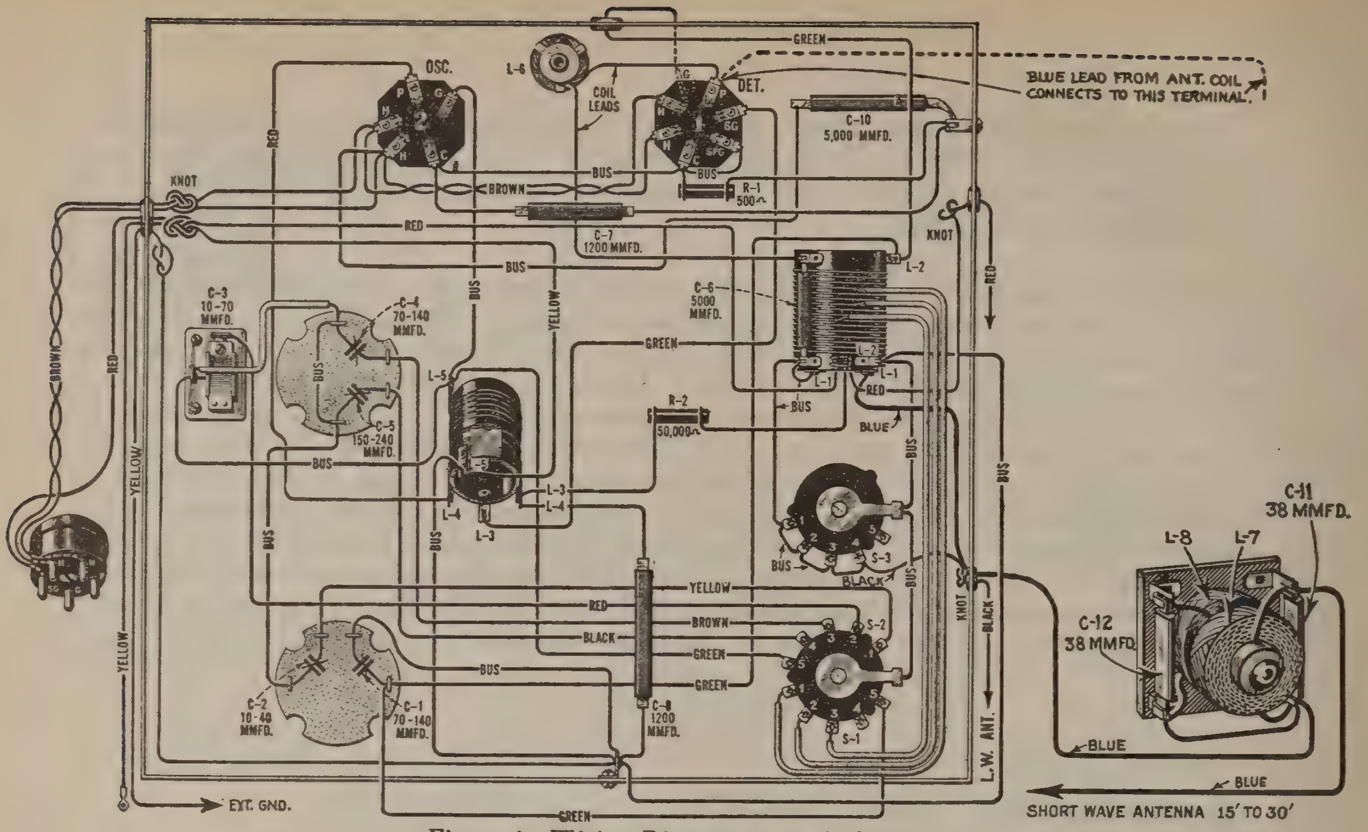


Figure 4—Wiring Diagram of A. C. SW-3

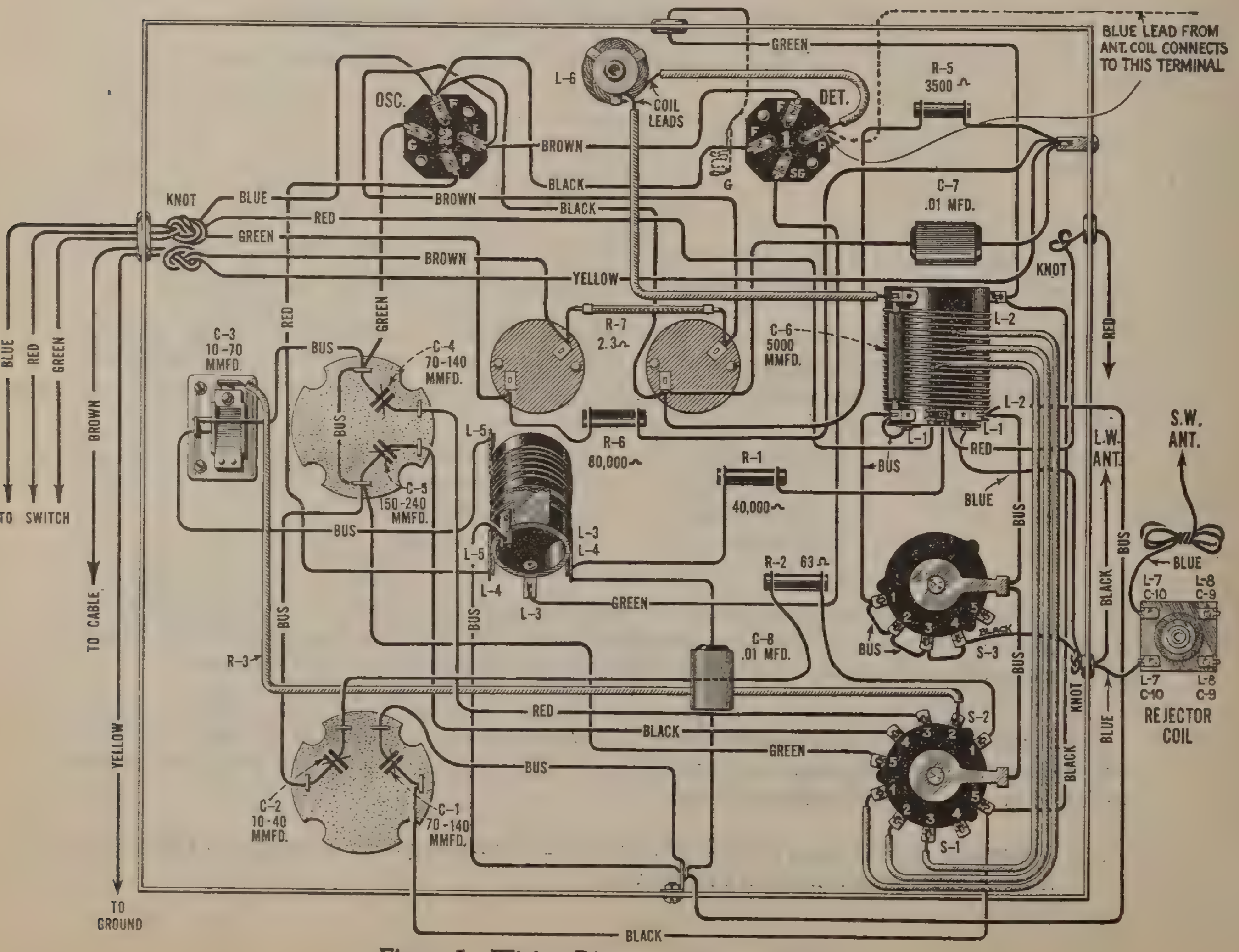


Figure 5—Wiring Diagram of Battery SW-3

2. Tune in a signal, on the receiver working properly, in the band it is desired to adjust the defective receiver. Then set the band switch and dial at the same position on the defective receiver as that of the receiver tuned to the signal.

3. For the 49 and 25 meter bands, turn C-3 or C-5, as the case may be, Figure 1, to the extreme minimum capacity position, counter-clockwise. Then turn slowly clockwise until the station being received on the first receiver is heard. For the 19 and 31 meter positions, the capacitors C-2 and C-4, as the case may be, should be first tuned to their maximum capacity position clockwise and then turned counter-clockwise until the signal is heard. This order should be carefully followed. The first point, after starting from the maximum or minimum position at which the signal is heard, is the correct adjustment. On some settings, two positions may be found but any one other than the first will result in improper tuning.

(2) DETECTOR ADJUSTMENT

The detector trimmer capacitor, if not properly adjusted, will cause insensitivity or excessive background noise on all bands.

This adjustment can only be made at the time of day when 49 meter stations can be received unless equipment for generating an artificial high-frequency (6075 K. C.) test signal of accurate frequency is available.

The adjustment should be made as follows:

1. Remove screws holding converter in cabinet and place converter at the rear of the chassis on a wooden box or other rest made of non-conductive material, leaving all connections intact so that proper operation is maintained. In models not having a hole in mounting plate to enable adjustment of C-1, the mounting plate must also be removed and so placed that it is not in the field of the coils of the converter.

2. Then tune in a station operating near the center of the 49 meter band (6075 K. C.) and adjust detector trimmer (C-1) for maximum volume. Rock the main tuning capacitor back and forth while making this adjustment.

   If no station operating close to 6075 K. C. can be heard, adjust for maximum volume on two stations successively, one on either side of 6075 K. C., noting position of trimmer and then placing the trimmer at the mean of the two positions.

3. Use of Station Finding Chart.

By thorough understanding and use of the Station Finder, the customer can obtain much greater satisfaction by enabling the rapid identification and dial setting of short wave stations.

In effect the Station Finder provides a calibration of the receiver tuning dial, converting the long wave markings 540 to 1500 K. C. to higher frequency calibrations, depending on the position of the range switch.

This is made possible by the fact that no matter what frequency is being received one dial division always represents 10 K. C.

The following example explains the operation:

With Range Switch in 49 meter position, assume that W8XK is tuned in at 1080 dial position. By reference to the Station Finder, it will be seen that in the section bracketed 49 M., W8XK is marked opposite 6140 K. C. the operating frequency of W8XK. This then means that 1080 corresponds to 6140 K. C. Rotate the inner circle so that 1080 is exactly opposite 6140, the point at which

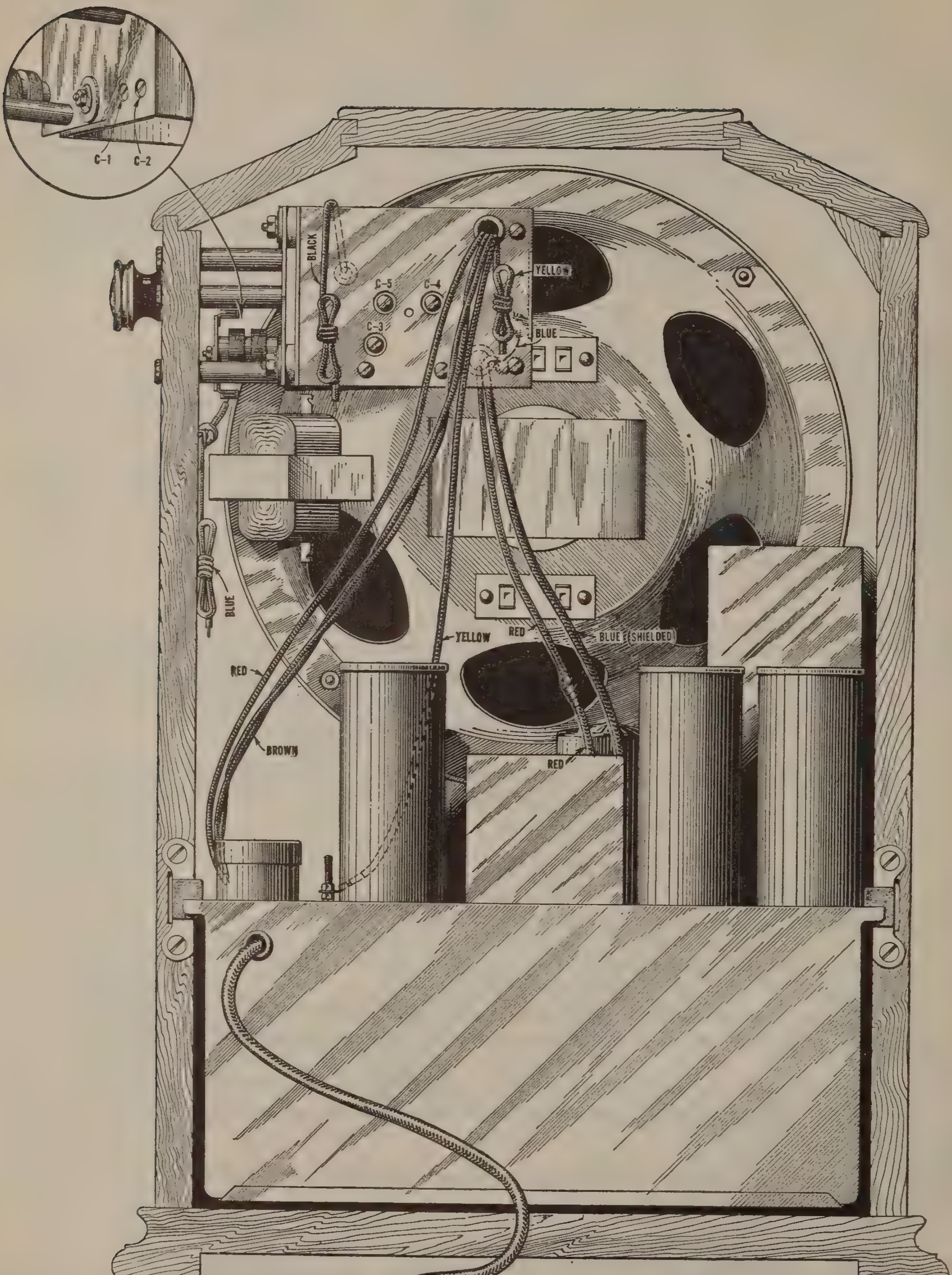


Figure 6—R-24-A Assembly Wiring

W8XK is marked. Then by reference to chart it will be seen that with the receiver tuned to 1180 it will be tuned to 6040 K. C. or the operating frequency of W4XB. Now, by outlining the index hole we can record, permanently, the point to set the Station Finder in order to find the dial setting for any 49 meter station. By looking on the Short Wave Broadcast Station List and Program Schedule we find that W3XAL operates on 6100 K. C.; then for the example given above we can immediately find that W3XAL will be received at 1120 K. C. and when received, the call letters may be marked in the margin opposite 6100 K. C.

Thus it is only necessary to log one station in a band to obtain the dial position for all stations in that band. The same procedure should be repeated for all bands.

In case it is found that any stations operating within the bands fall outside of the region from 950–1300 K. C., the oscillator trimmer condenser for that band should be readjusted so as to bring all stations within the region of 950–1300 K. C. in order to obtain maximum efficiency.

It is recommended that each receiver be checked and the Station Finder be logged for the particular set, marking the serial number on the Station Finder before sending to customer's house. Then when installed the operation of the Station Finder should be demonstrated, stressing the ease of tuning and separation of stations obtained.

(3) GENERAL NOTES

The following general notes will help in the performance of service work in conjunction with receivers using the SW-3.

1. Keep the antenna lead of the converter as far as possible from the broadcast receiver chassis.

2. If modulation hum is encountered, connect a 5000 mmfd. capacitor from either heater lead to ground. Later production instruments include this capacitor.

3. The shielding on the grid of the R. F. tube should be kept as loose as possible. If it is drawn tight it will affect the adjustment of the R. F. Trimmer Capacitor on the broadcast receiver.

4. Keep all other shielding tight, especially the shield over the lead from the converter to the shielded antenna coil, pushing it tight against the coil shield and thus covering the wire entirely.

5. If it is desired to use only one antenna, connect the antenna permanently to the blue lead from the Converter. If sufficient signal strength is not obtained on long wave reception, provide a single pole, single throw switch for connecting the black lead to the blue when long wave reception is desired. A clip on the black lead can be used if a switch is not available.

6. In buildings of metal framework or even with a metal roof, an indoor antenna or an outdoor antenna that does not extend beyond the shielding effect of the building will not be satisfactory. For such installations, an outdoor antenna must be used and the lead-in placed away from any metal parts of the building.

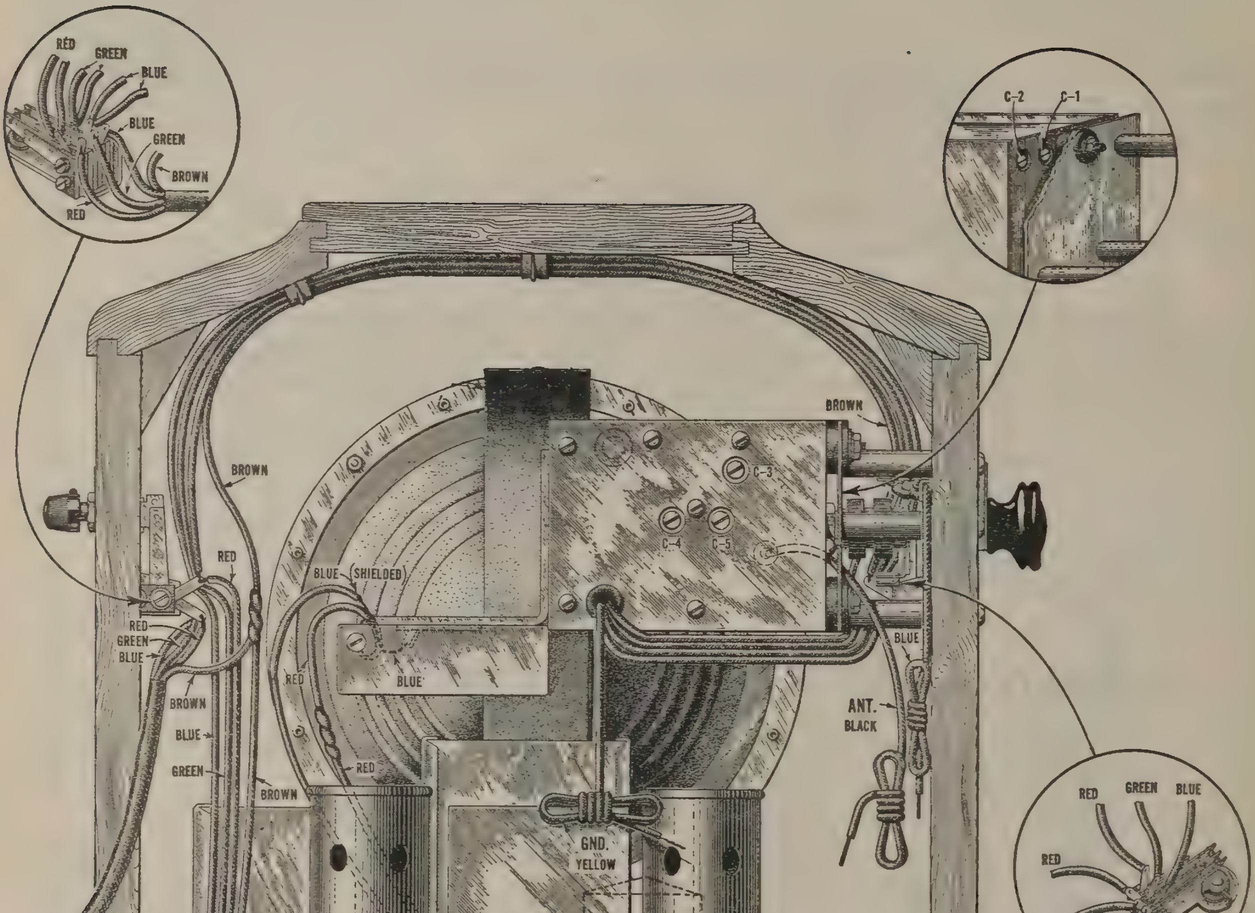


Figure 7—R-24-B Assembly Wiring

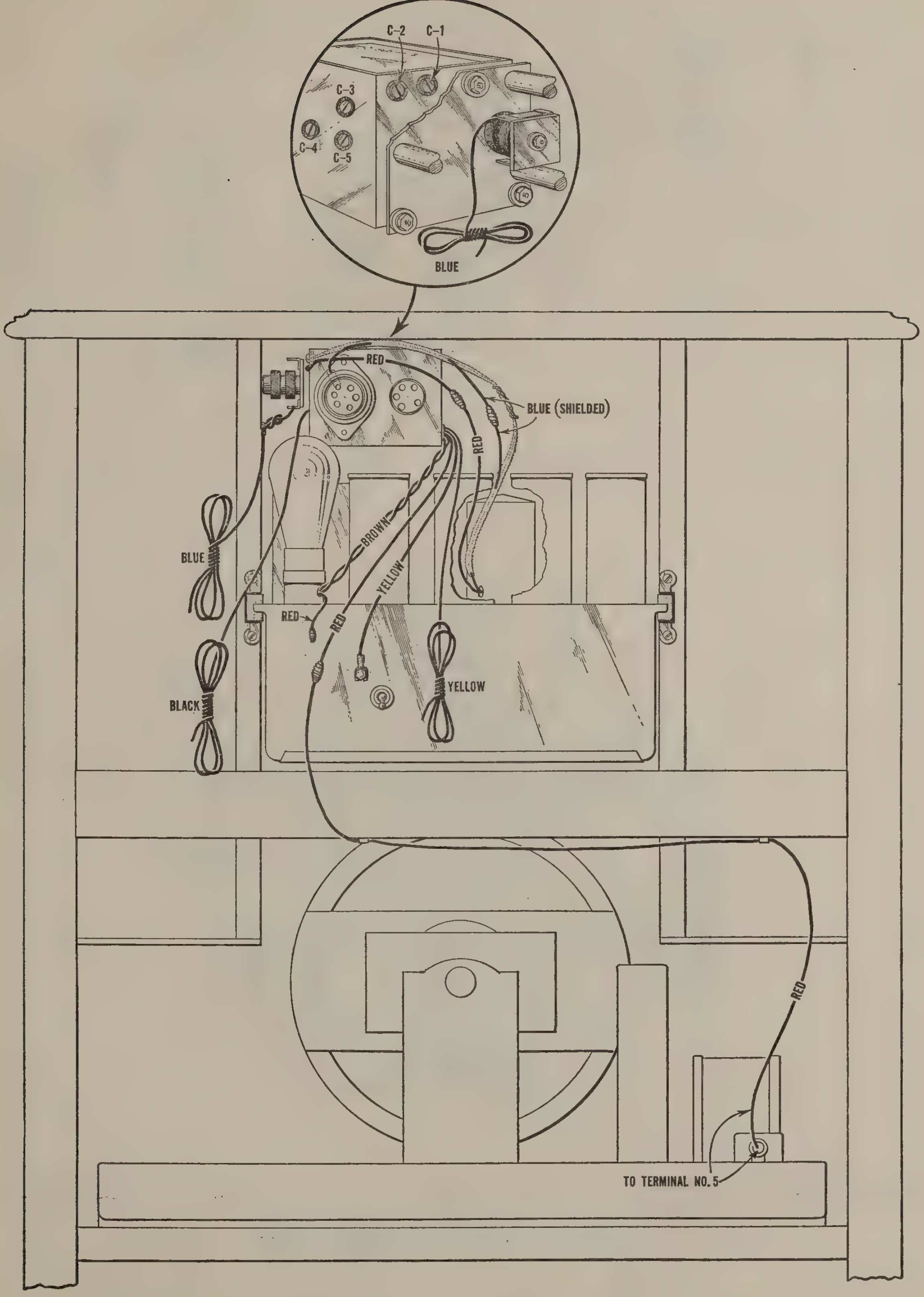


Figure 8—R-78-S. W. Assembly Wiring

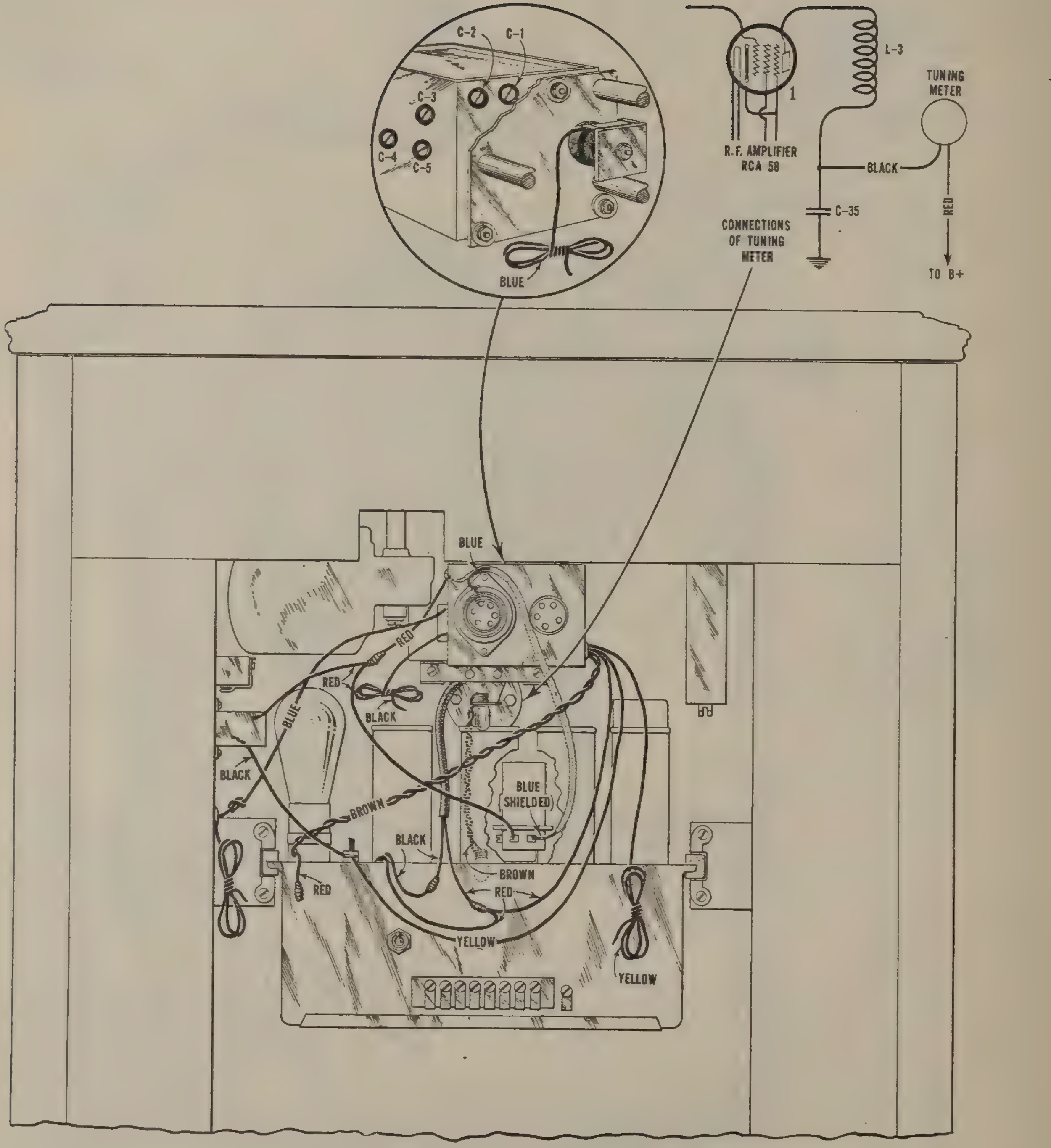


Figure 9—RAE-84-S. W. Assembly Wiring

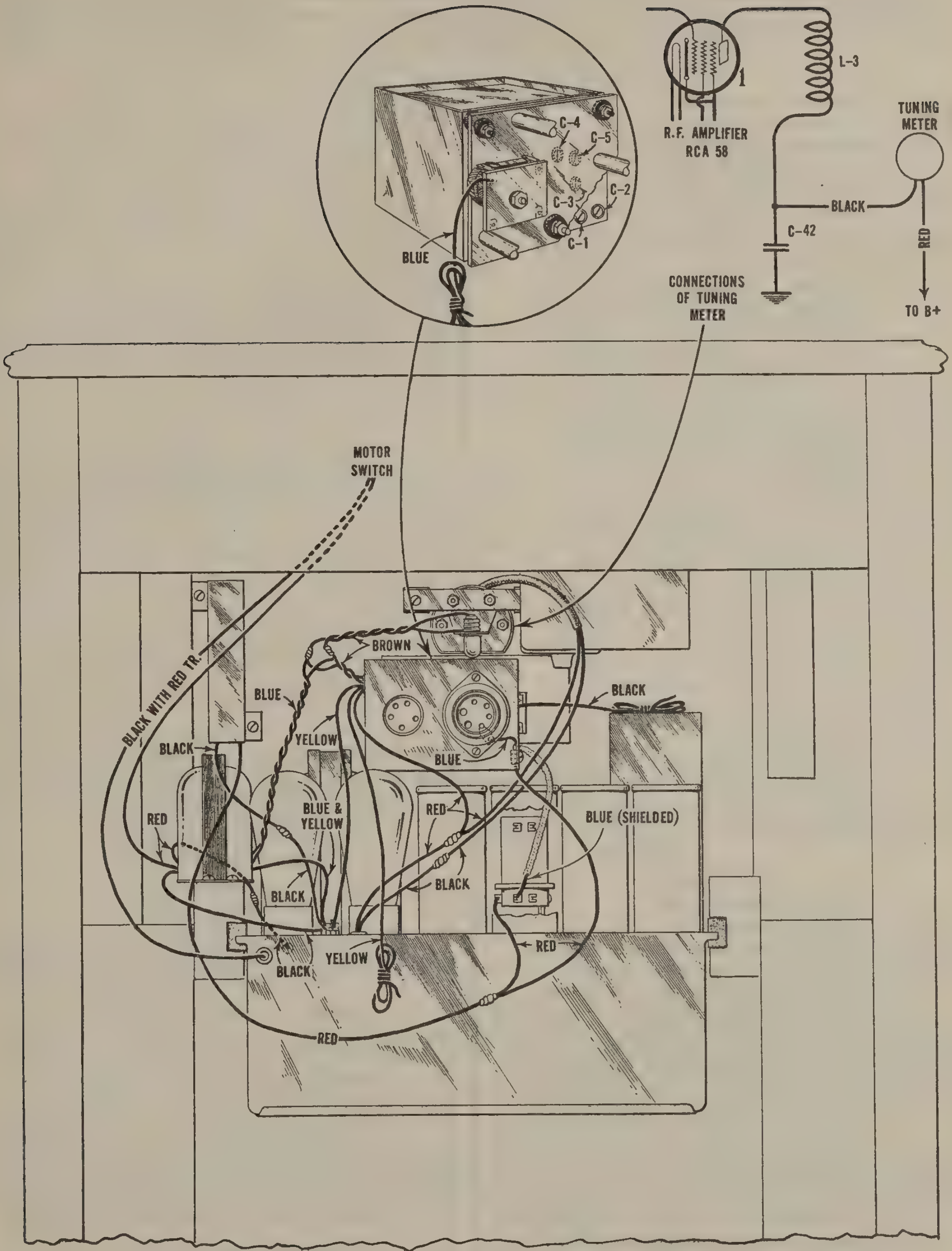


Figure 10—RE-81-S. W. Assembly Wiring

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	SW-3 A. C.	
2012	Capacitor—1200 mmfd.	$0.55
2747	Contact cap—Package of 5	.50
2969	Resistor—50,000 ohms—Carbon type—1 watt—Package of 5	2.50
2932	Capacitor—5000 mmfd.	1.00
3383	Resistor—500 ohms—Carbon type—½ watt—Package of 5	2.50
3420	Switch—Range selector switch	2.00
3421	Coil—Oscillator coil	1.10
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.	1.10
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.	1.10
3424	Coil—Detector coil	1.60
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.	.75
3426	Escutcheon — Range selector switch escutcheon	.50
3427	Capacitor—10 mfd. capacitor	2.15
3428	Plate—Converter mounting plate assembly	.85
3429	Screw—Converter mounting screw—Package of 3	.50
3500	Coil—Rejector coil—Located on mounting plate	1.46
3501	Capacitor — 38 mmfd. — Located on resistor board	.44
3504	Shield—Detector shield	.34
6100	Coil—Choke coil	.75
6109	Knob—Range selector switch knob—Package of 5	1.75
6350	Adaptor—Five prong adaptor plug complete with leads	1.25
7484	Socket—UY type Radiotron socket	.65
7485	Socket—Radiotron 6 contact socket	.70
	SW-3 (Battery)	
2747	Contact cap—Package of 5	.50
2932	Capacitor—5000 mmfd.	1.00
3045	Resistor—40,000 ohms—1 watt—Carbon type—Package of 5	2.50
3297	Resistor—80,000 ohms—½ watt—Carbon type—Package of 5	2.50
3420	Switch—Range selector switch	2.00
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.	1.10
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.	1.10
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.	.75
3426	Escutcheon — Range selector switch escutcheon	.50
3428	Plate—Converter mounting plate assembly	.85
3429	Screw—Converter mounting screw—Package of 3	.50
3500	Coil—Rejector coil	1.46
3501	Capacitor — 38 mmfd. — Located on rejector coil	$0.44
3504	Shield—Detector shield	.34
3576	Resistor—2.3 ohms—Flexible type—Package of 5	1.20
3577	Resistor—3,500 ohms—½ watt—Carbon type—Package of 5	1.00
3578	Capacitor—0.01 mfd.	.38
3579	Resistor—63 ohms—½ watt—Carbon type—Package of 5	1.00
6100	Coil—Choke coil	.75
6109	Knob—Range switch selector knob—Package of 5	1.75
6300	Socket—4 contact Radiotron socket	.55
6379	Coil—Detector coil	1.52
6380	Coil—Oscillator coil	1.08
7488	Shield—Detector tube shield top	.50
	SPECIAL PARTS FOR R-24-A, R-24-B, RE-81 and RAE-84 RECEIVER ASSEMBLIES	
3502	Base and mounting bracket for R. F. coil	.32
3503	Shield—R. F. coil shield	.36
6411	Coil—R. F. coil complete with mounting bracket	1.54
	SPECIAL PARTS FOR R-24-A RECEIVER ASSEMBLIES	
3522	Resistor—17,000 ohms—Carbon type—½ watt—Package of 5	1.00
	REPRODUCER ASSEMBLIES	
6390	Transformer—Output transformer	2.12
8976	Coil assembly—Comprising field coil magnet and cone support	4.30
	SPECIAL PARTS FOR R-24-B RECEIVER ASSEMBLIES	
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3079	Resistor—40,000 ohms—Carbon type—½ watt—Package of 5	2.50
6312	Capacitor—650 mmfd.—Package of 5	2.50
	SPECIAL PARTS FOR RE-81	
7587	Transformer—Filament transformer	4.25
	SPECIAL PARTS FOR RAE-84	
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3505	Capacitor—0.1 mfd.	.36
3506	Knob—Range switch selector knob	.50
3523	Capacitor pack—Comprising two 0.05 mfd. capacitors in metal container	.72
	SPECIAL PARTS FOR RE-81 and RAE-84	
6412	Capacitor—10 mfd.	1.62
6413	Meter—Tuning meter	2.38

Instructions for

Counter Demonstrator CRD-9 (DC)

(Direct Current Model)

INTRODUCTION

This electric phonograph model provides high quality reproduction of phonograph records for store demonstration purposes. It is arranged for manual operation from behind the counter.

The volume control is equipped with a locking device for limiting the loudspeaker output to the desired maximum. This adjustment is set at the factory in accordance with the customer's specifications. The locking device can be re-adjusted by the customer to meet special conditions.

INSTALLATION

Preliminary—After withdrawing the instrument from the shipping container, remove the shipping block from the bottom of the cabinet. Then remove the corrugated support and tape holding the pickup arm. Unpack the turntable and Radiotrons from their separate containers.

Turntable—Mount the turntable on the motor spindle. Make sure that the pin on the spindle engages the slot in the turntable hub.

Radiotrons—To install the Radiotrons, slide the small door in the rear panel toward the right. The positions of the tubes in the respective sockets are shown on the rating label which can be seen through the door opening. They are, left to right, as follows: RCA-89, RCA-89, and RCA-37. Attach the two flexible leads, indicated on the label, to the top terminals of the RCA-89 Radiotrons—press the spring contact clips down firmly.

Power Supply—After placing the demonstrator in its desired location on the counter, connect the power cord to an electrical outlet supplying direct current within the voltage limits specified on the rating label. IMPORTANT—*The amplifier will not function unless the prongs of the attachment plug are inserted in the outlet so as to give the proper polarity. The correct position of the plug must be determined by trial operation.*

OPERATION

The controls of the demonstrator are located as follows (viewing the instrument from the rear):

Power Switch—On right-hand side panel. This switch is "on" when the knob is upward.

Motor Switch—On left-hand side panel. This switch is "on" when the knob is upward.

Volume Control—On rear of cabinet, near right-hand side. Turn this control clockwise to increase the volume.

Speed Regulator—Lever extending from under turntable on left side of motor board.

The demonstrator should be operated as follows:

1. Set the Power Switch to the "on" position.
2. Place a standard (78 r.p.m.) record on the turntable. Insert a needle in the pickup needle holder and tighten the needle screw. Any of the following types of needles may be used:
   (a) RCA Victor "Tungstone"—Full Volume. This needle with care, will play from 100 to 200 records.
   (b) RCA Victor "Chromium"—either green or orange shank. The green needle will play 75 to 100 records, and the orange needle approximately 25 records. *Never re-insert a used Chromium needle after once removed from the pickup.*
   (c) RCA Victor Steel—Full Volume. A new steel needle should be inserted before playing each record.
3. Start the turntable by setting the Motor Switch to the "on" position.
4. Lower the needle onto the smooth outer rim of the record and slide it onto the first groove.
5. Adjust the Volume Control to obtain the desired volume.

   NOTE—If the maximum volume, obtained with the volume control in the extreme clockwise position, is insufficient to meet the requirements of a particular installation, the locking device may be re-adjusted as follows: (1) Remove volume control knob by pulling outward; (2) take off rear panel by removing screws at edges; (3) loosen lock nut holding right angled bracket which serves as stop for metal pointer on shaft; (4) turn shaft clockwise until volume is increased to desired level; (5) lock bracket in new position against pointer, by retightening lock nut; and (6) replace rear panel and knob.
6. When the record has been played, or when it is desired to interrupt the record, lift the pickup and lower it outside the turntable toward the right. Stop the turntable by setting the Motor Switch downward.
7. When operation is to be discontinued for an appreciable interval, set the Power Switch to the "off" position, downward.

   NOTE—The pickup should not be left resting on a record or on the turntable when not playing.

Turntable Speed—The correct speed of the turntable is 78 revolutions per minute. This should be checked frequently by placing a piece of white paper under the edge of the record and counting the revolutions during one minute *while playing.* If speed is under 78 r.p.m., move Speed Regulator toward "F"; if over 78 r.p.m., move the lever toward "S," until the correct speed is obtained.

CARE OF INSTRUMENT

Cabinet—The cabinet may be polished at necessary intervals, using any good non-abrasive lacquer polish (such as RCA Victor Cabinet Cleaner), which should be applied with a soft cloth. The motor board and pickup arm should be kept free of dust, using a slightly moist cloth if necessary.

Radiotrons—*Always set the Power Switch in the "off" position before removing any Radiotron from its socket.* The Radiotrons should be tested periodically by substituting a new one in place of each in succession and comparing the reproduction. If a new Radiotron shows appreciable increase in volume the old one is worn out and should be discarded.

Lubrication—The motor should be regularly lubricated, as follows: *Monthly*—Remove the turntable and apply light machine oil in each of the two "OIL" holes leading to the motor shaft main bearings, also at the top spindle bearing. Remove the rear panel (after first pulling off the volume control knob) and apply light machine oil on the bottom spindle bearing, also on the governor friction pad (which presses against metal disc adjacent to governor weights). *Semi-annually*—With rear panel removed, apply two or three drops of light machine oil at the two motor shaft *thrust* bearings (one located to right of commutator and the other to left of governor); also apply light motor grease (or petroleum jelly) on the worm gear.

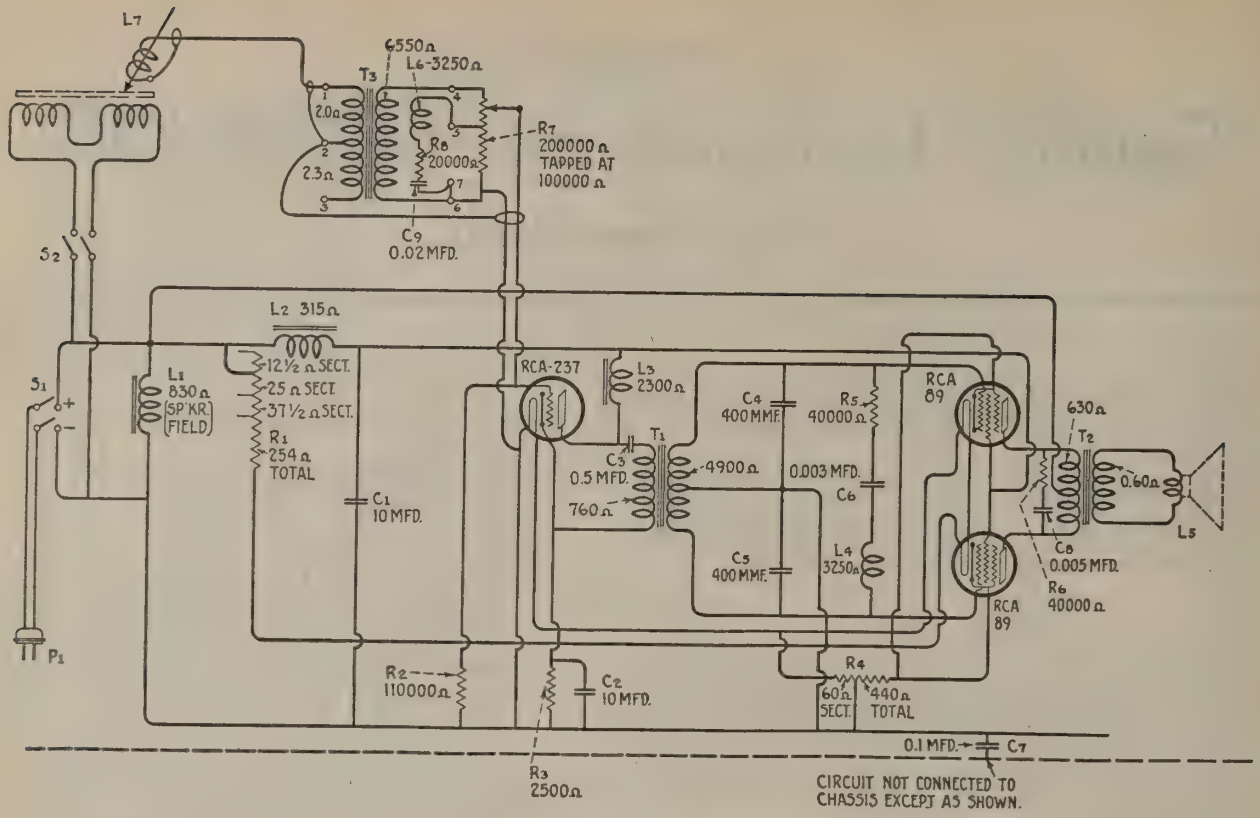


Figure A—Schematic Circuit Diagram

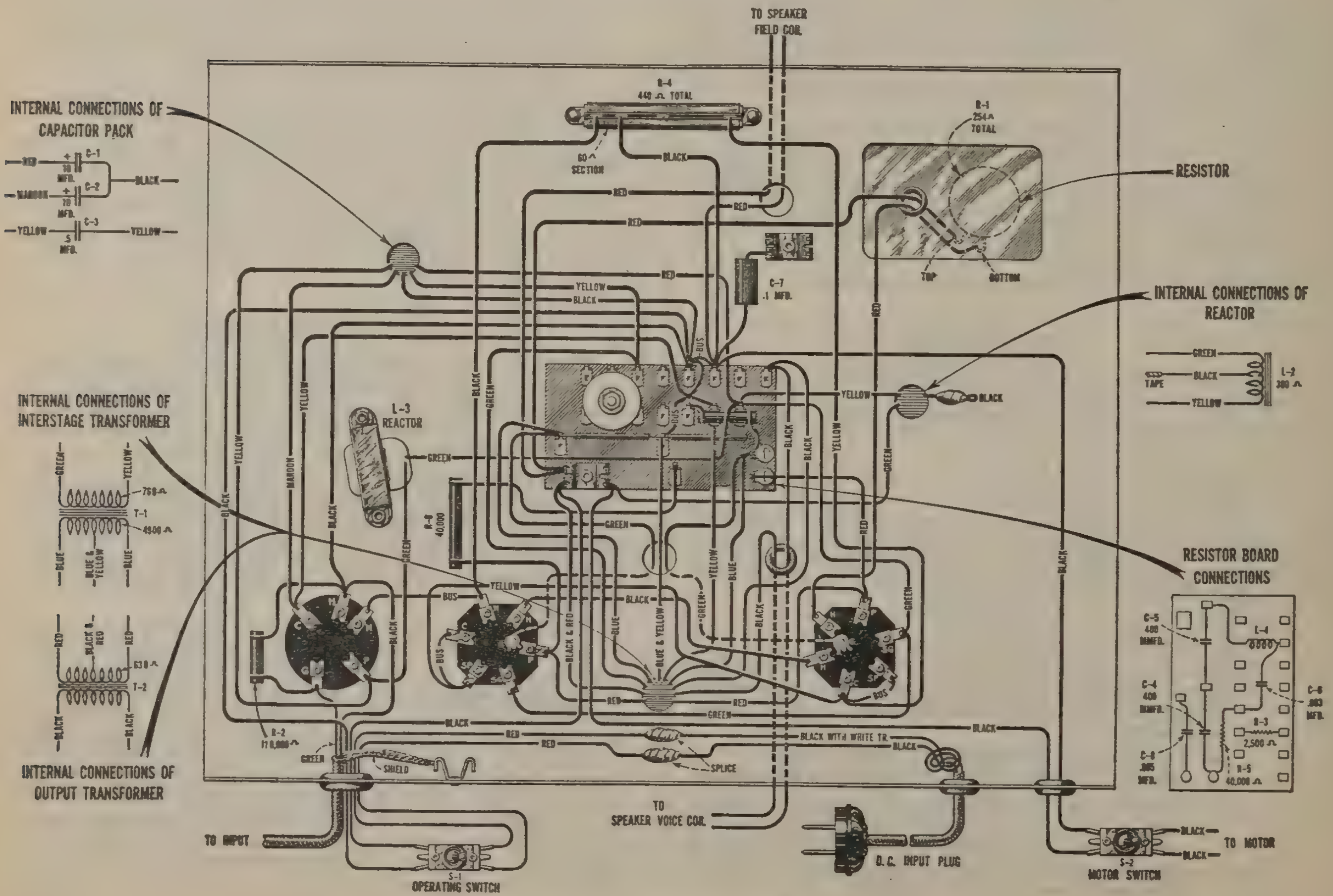


Figure B—Amplifier Wiring

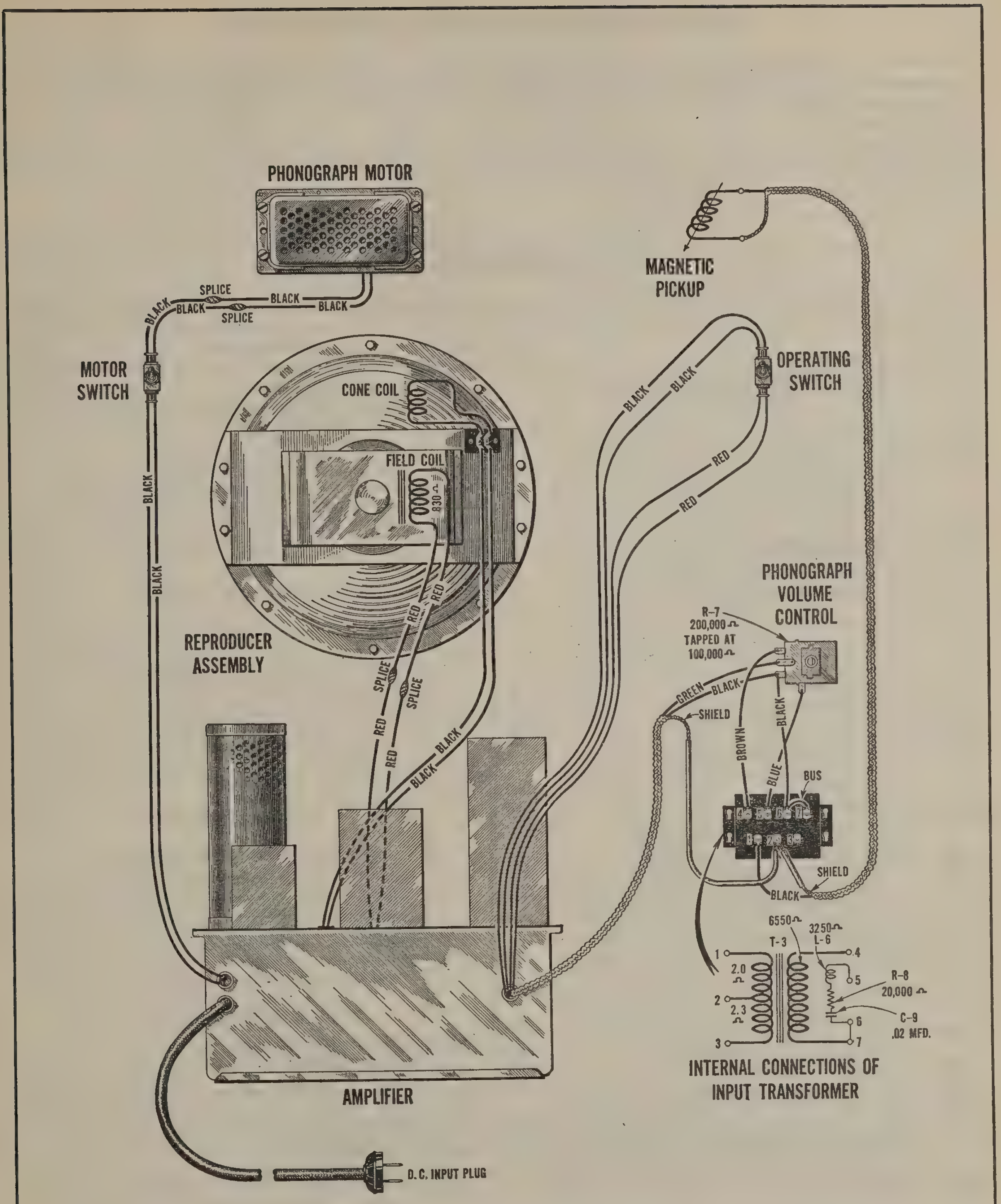


Figure C—Assembly Wiring

RADIOTRON SOCKET VOLTAGES

Radiotron No.	Filament to Control Grid, Volts	Filament to Screen Grid, Volts	Filament to Plate, Volts	Plate Current, M. A.	Filament Volts
RCA-237 A. F.	6.0	—	100	2.4	6.3
RCA-89 Pwr.	17.0	93	87	17.0	6.3
RCA-89 Pwr.	17.0	93	87	17.0	6.3

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	PICKUP, ARM AND TURNTABLE ASSEMBLIES	
3385	Coil—Pickup coil	$0.50
3386	Cover—Pickup cover	.75
3387	Screw assembly—Pickup mounting screw assembly—Comprising one screw, one nut, and one washer—Package of 10	.60
3388	Screw—Pickup needle holding screw—Package of 10	.80
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.50
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.65
3417	Armature—Pickup armature	.75
3418	Cushions—Pickup rubber cushions—Comprising one damper, two spacer cushions and one damper bushing—Pkg. of 5 sets	1.25
3419	Screw—Pickup cover mounting screw—Package of 10	.50
6335	Pickup—Pickup unit complete	12.00
6346	Back—Pickup housing back	.65
7084	Cover—Suede cover for turntable	.50
7530	Arm—Pickup arm complete—Less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
8968	Turntable complete	2.58
	AMPLIFIER ASSEMBLIES	
2882	Socket—Radiotron 5 contact socket	.50
3045	Resistor — 40,000 ohms — Carbon type — 1 watt—Package of 5	2.50
3085	Capacitor—400 mmfd.—Located on resistor board	.60
3099	Capacitor—0.005 mfd.—Located on resistor board	.75
3295	Resistor—110,000 ohms—Carbon type—½ watt—Package of 5	2.50
3476	Cable—Shielded two conductor cable—Approximately 13½″ long	.36
3478	Resistor—254 ohms—Porcelain type—Tapped at 12.5, 12.5, 12.5 and 216.5 ohms	1.86
3480	Capacitor—0.1 mfd.	1.34
3481	Coil—Choke coil—Located on resistor board	.70
3482	Capacitor—0.003 mfd.—Located on resistor board	1.52
6383	Capacitor pack–Comprising two 10.0 mfd. and one 0.5 mfd. capacitors in metal container	7.84

Stock No.	DESCRIPTION	List Price
7270	Reactor—Filter reactor	$4.00
7458	Resistor—Flat type—440 ohms—Tapped at 60, 130 and 250 ohms—Complete with mounting rivets	1.10
7485	Socket—Radiotron 6 contact socket	.70
7512	Reactor—RCA-237 plate reactor	2.00
7568	Transformer—Audio transformer assembly—Comprising interstage and output transformer in metal container	4.48
7573	Resistor—Filament regulating resistor	2.60
7574	Shield—Filament resistor shield complete	1.60
	MOTOR ASSEMBLIES	
3486	Motor mounting assembly—Comprising 1 washer, 4 spacers, 4 screws, 4 lock washers and 4 nuts	.30
3487	Governor assembly — Comprising friction disc, two springs, two balls—Assembled and mounted	2.00
3488	Pin—Governor (speed) regulating pin	.30
3489	Indicator pointer—Speed indicator pointer complete with mounting screws and washers	1.65
6387	Spindle—Turntable spindle with fibre gear	14.20
6388	Rotor—Rotor and shaft	16.20
8970	Motor—D. C. 110 volt motor complete	34.40
	REPRODUCER ASSEMBLIES	
3483	Bolt—Reproducer mounting bolt assembly—Comprising 2 hook bolts, 2 washers, 2 lock washers and 2 nuts	.78
6382	Transformer—Input transformer	3.88
8916	Cone—Reproducer cone—Package of 5	15.00
9424	Coil assembly—Comprising field coil, magnet and cone support	9.00
	MISCELLANEOUS PARTS	
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5	2.00
3484	Switch—Power or motor switch—Double pole, single throw—Toggle type	1.76
6288	Knob—Volume control knob—Package of 5	1.50
6384	Volume control complete with mounting washer and nut	1.60
7054	Cord—Power cord	1.00

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RCA Victor Company, Inc.
Camden, N. J., U. S. A.

Printed in U. S. A.

Instructions for

Counter Demonstrator CRD-9

(A. C. Operated)

INTRODUCTION

This electric phonograph model provides high quality reproduction of phonograph records for store demonstration purposes. It is arranged for manual operation from behind the counter. Jacks are provided for connecting to an external source of audio input, such as an automatic record changer. A transfer switch permits quick change-over from the demonstrator pickup to the external source.

The volume control is equipped with a locking device for limiting the loudspeaker output to the desired maximum. This adjustment is set at the factory in accordance with the customer's specifications. The locking device can be re-adjusted by the customer to meet special conditions.

INSTALLATION

Preliminary—After withdrawing the instrument from the shipping container, remove the shipping block from the bottom of the cabinet. Then remove the corrugated support and tape holding the pickup arm. Unpack the turntable and Radiotrons from their separate containers.

Turntable—Mount the turntable on the motor spindle. Make sure that the pin on the spindle engages the slot in the turntable hub.

Radiotrons—To install the Radiotrons, slide the small door in the rear panel toward the right. The positions of the tubes in the respective sockets are shown on the rating label which can be seen through the door opening. They are, left to right, as follows: RCA-80, RCA-47, RCA-47 and RCA-30.

Power Supply—After placing the demonstrator in its desired location on the counter, connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label.

OPERATION

The controls of the demonstrator are located as follows (viewing the instrument from the rear):

Power Switch—On right-hand side panel (upper switch). This switch is "on" when the knob is upward.

Motor Switch—On left-hand side panel. This switch is "on" when the knob is upward.

Transfer Switch—On right-hand side panel (lower switch) just above external input jacks. The positions of this switch are upward when using the demonstrator pickup and downward for external input.

Volume Control—On rear of cabinet, near right-hand side. Turn this control clockwise to increase the volume.

To play records on the turntable of the demonstrator, proceed as follows:

1. Set the Power Switch to the "on" position. Make sure that the Transfer Switch is set in the upward position.
2. Place a standard (78 r.p.m.) record on the turntable. Insert a needle in the pickup needle holder and tighten the needle screw. Any of the following types of needles may be used:
   - (a) RCA Victor "Tungstone"—Full Volume. This needle with care, will play from 100 to 200 records.
   - (b) RCA Victor "Chromium"—either green or orange shank. The green needle will play 75 to 100 records, and the orange needle approximately 25 records. *Never re-insert a used Chromium needle after once removed from the pickup.*
   - (c) RCA Victor Steel—Full Volume. A new steel needle should be inserted before playing each record.
3. Start the turntable by setting the Motor Switch to the "on" position.
4. Lower the needle onto the smooth outer rim of the record and slide it into the first groove.
5. Adjust the Volume Control to obtain the desired volume.

   NOTE—If the maximum volume, obtained with the volume control in the extreme clockwise position, is insufficient to meet the requirements of a particular installation, the locking device may be re-adjusted as follows: (1) Remove volume control knob by pulling outward; (2) take off rear panel by removing screws at edges; (3) loosen lock nut holding right angled bracket which serves as stop for metal pointer on shaft; (4) turn shaft clockwise until volume is increased to desired level; (5) lock bracket in new position against pointer, by retightening lock nut; and (6) replace rear panel and knob.
6. When the record has been played, or when it is desired to interrupt the record, lift the pickup and lower it outside the turntable toward the right. Stop the turntable by setting the Motor Switch downward.
7. When operation is to be discontinued for an appreciable interval, set the Power Switch to the "off" position, downward.

   NOTE—The pickup should not be left resting on a record or on the turntable when not playing.

External Input—To use the demonstrator amplifier and loudspeaker for reproduction from an external source of audio frequency input, proceed as follows:

1. Plug the two wires (which should be equipped with pin terminals) from the external source into the pin jacks located below the Transfer Switch.

   NOTE—The impedance of the external input circuit should match that of the demonstrator input, which is approximately 10 ohms at 1,000 cycles.
2. Set the Power Switch to the "on" position. The Motor Switch should be in the "off" position.
3. Set the Transfer Switch in the downward position. Signals originating in the external input circuit will now be heard through the demonstrator loudspeaker.
4. Adjust the volume to the desired level by means of the demonstrator Volume Control.
5. When through operating, set the Power Switch to the "off" position.

CARE OF INSTRUMENT

Cabinet—The cabinet may be polished at necessary intervals, using any good non-abrasive lacquer polish (such as RCA Victor Cabinet Cleaner), which should be applied with a soft cloth. The motor board and pickup arm should be kept free of dust, using a slightly moist cloth if necessary.

Radiotrons—*Always set the Power Switch in the "off" position before removing any Radiotron from its socket.* The Radiotrons should be tested periodically by substituting a new one in place of each in succession and comparing the reproduction. If a new Radiotron shows appreciable increase in volume the old one is worn out and should be discarded.

Motor—The motor should be lubricated monthly with light oil. Two oil holes, on the top of the motor, are accessible when the turntable is removed.

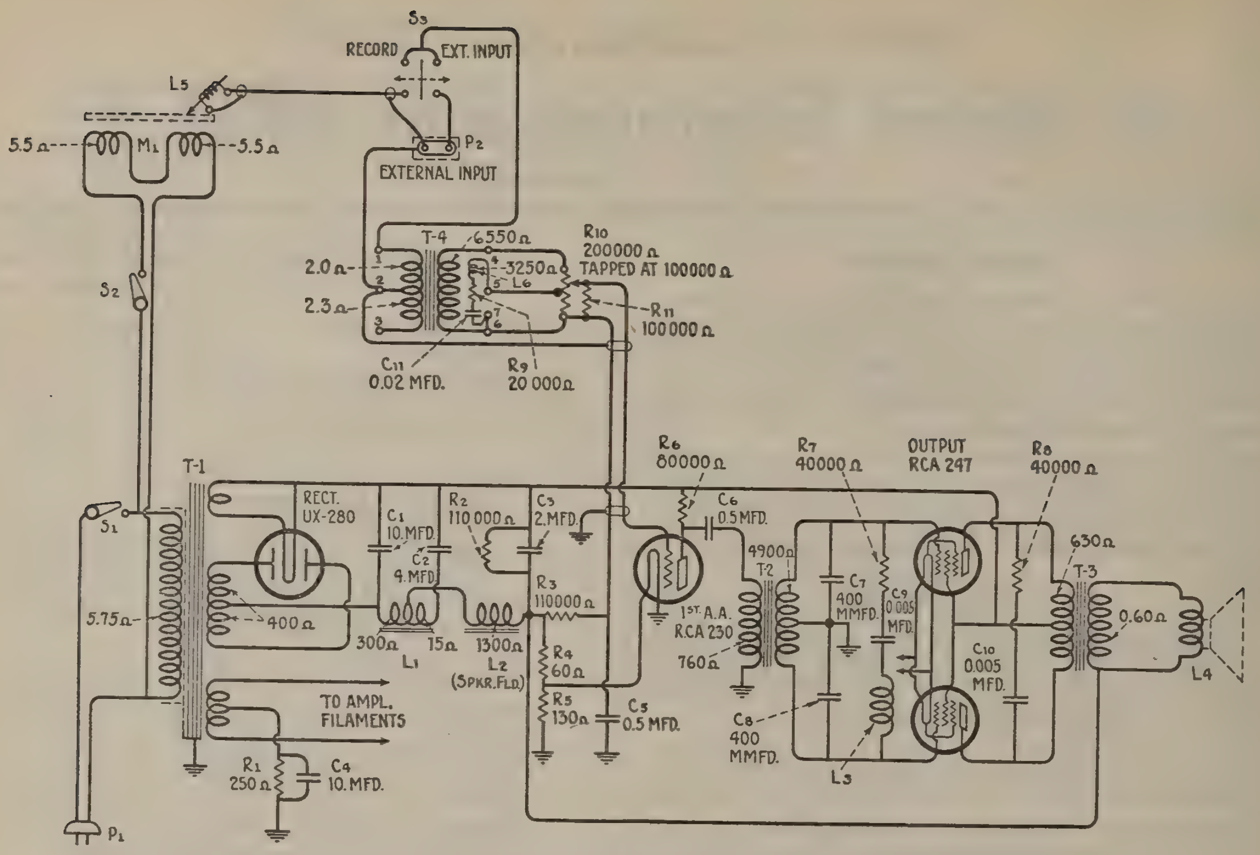

Figure A—Schematic Circuit

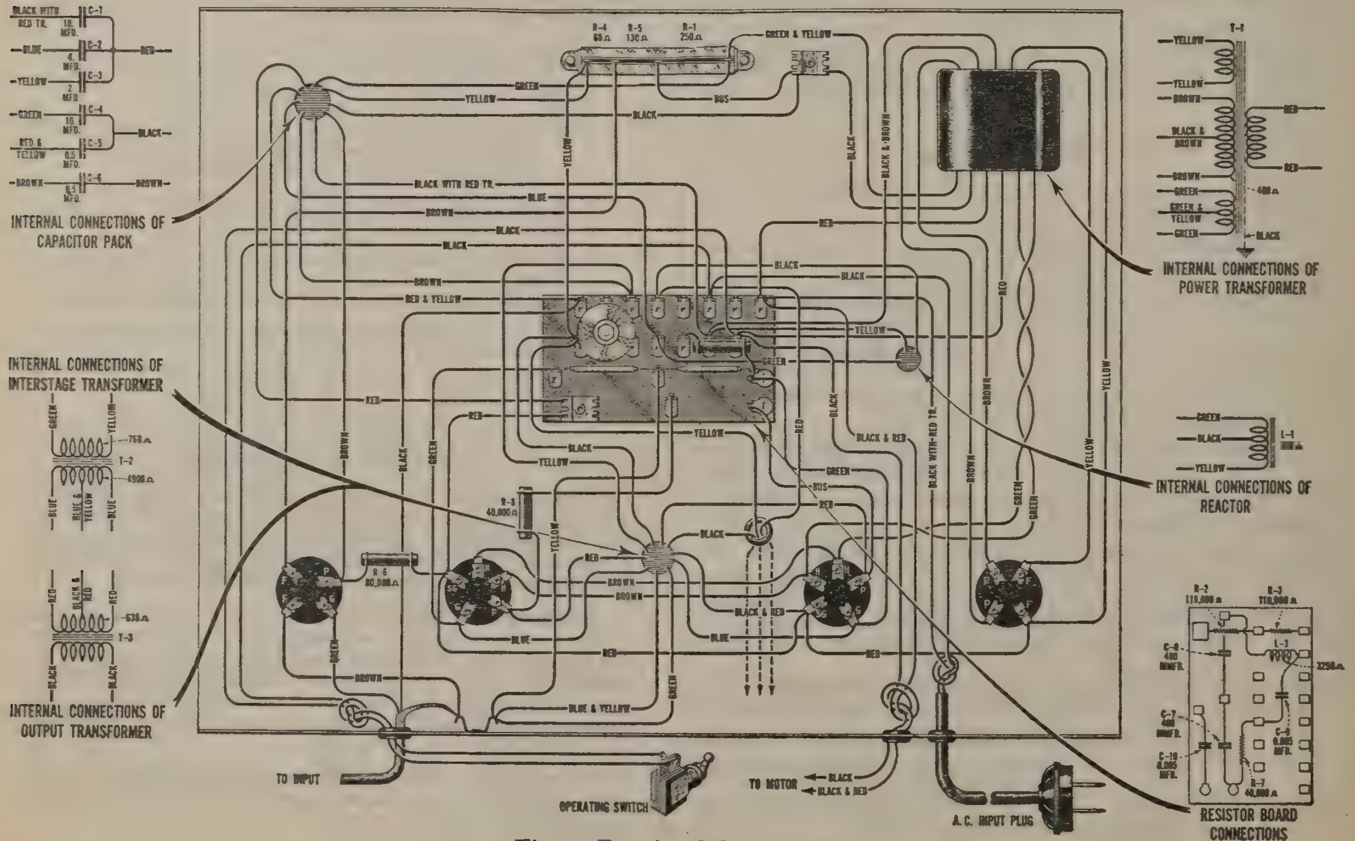

Figure B—Amplifier Wiring

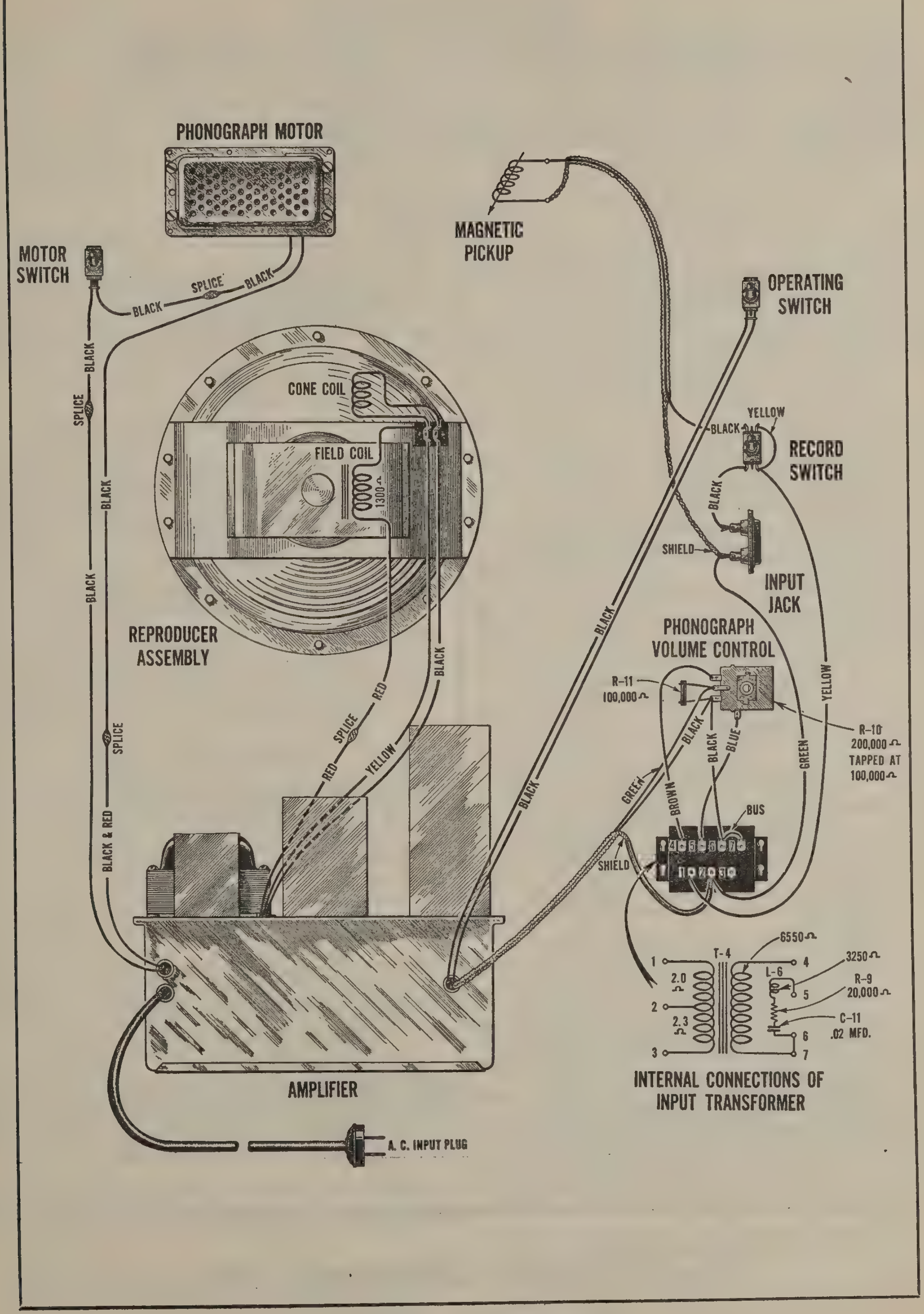

Figure C—Assembly Wiring

SERVICE DATA

Radiotron No.	Filament to Control Grid	Filament to Screen Grid	Filament to Plate	Plate Current M. A.	Filament Volts
RCA-230—A. F.	4.5	—	260	2.0	2.0
RCA-247—Pwr.	17.0	260	250	30.0	2.5
RCA-247—Pwr.	17	260	250	30.0	2.5
UX-280—Rect.	375 volts each plate—80 M. A. total current				

PICKUP, ARM AND TURNTABLE ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3385	Coil—Pickup coil	$0.50
3386	Cover—Pickup cover	.75
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10	.60
3388	Screw—Pickup needle holding screw—Package of 10	.80
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.50
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.65
3417	Armature—Pickup armature	.75
3418	Cushions—Pickup rubber cushions—Comprising one damper, two spacer cushions and one damper bushing—Package of 5 sets	1.25
3419	Screw—Pickup cover mounting screw—Package of 10	.50
6335	Pickup—Pickup unit complete	12.00
6346	Back—Pickup housing back	.65
7084	Cover—Suede cover for turntable	.50
7530	Arm—Pickup arm complete—Less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
8968	Turntable complete	2.58

AMPLIFIER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2882	Socket—5 contact Radiotron socket complete with insulator	.50
2968	Socket—4 contact Radiotron socket complete with insulator—For Radiotron UX-280	.50
3032	Socket—4 contact Radiotron socket complete with insulator—For Radiotron RCA-230	.50
3045	Resistor—40,000 ohms—Carbon type—1 watt—Package of 5	2.50
3085	Capacitor—400 mmfd.—Located on resistor board	.60
3099	Capacitor—0.005 mfd.—Located on resistor board	.75
3295	Resistor—110,000 ohms—Carbon type—½ watt—Package of 5	2.50
3297	Resistor—80,000 ohms—Carbon type—1 watt—Package of 5	2.50
3475	Switch—Phonograph and amplifier switch—Single pole, single throw—Toggle type	1.28
3476	Cable—Shielded two conductor cable—Approximately 13½ inches long	$0.36
3479	Capacitor — 0.005 mfd. — Located nearest choke coil on resistor board	.80
3481	Coil—Choke coil—Located on resistor board	.70
7270	Reactor—Filter reactor	4.00
7458	Resistor—Flat type—440 ohms—Tapped at 60, 130 and 250 ohms—Complete with mounting rivets	1.10
7568	Transformer assembly—Comprising interstage and output transformer in metal container	4.48
7569	Capacitor pack—Comprising two 10.0 mfd., one 4.0 mfd., one 2.0 mfd. and two 0.5 mfd	4.68
8900	Transformer—Power transformer	9.00

MOTOR ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3398	Motor mounting assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer—One set	.75
7389	Rotor and shaft for 105–125 volts—60 cycle motor	9.00
8966	Motor—Motor complete—105–125 volts—60 cycles	18.26
8967	Spindle—Turntable spindle with fibre gear for 60 cycle motor	8.00

MISCELLANEOUS PARTS

Stock No.	DESCRIPTION	List Price
2761	Jack—Twin jack with mounting screws	5.00
3101	Switch—Phonograph switch—Double pole, single throw—Toggle type—Located on upper left side of cabinet	1.25
3118	Resistor—100,000 ohms—Carbon type—¼ watt—Package of 5	2.00
6288	Knob—Volume control knob—Package of 5	1.50
6292	Switch—Motor switch—Single pole, single throw—Toggle type	1.25
6384	Volume control—Complete with mounting washer and nut	1.60
7054	Cord—Power cord	1.00

REPRODUCER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3483	Bolt—Reproducer mounting bolt assembly—Comprising 2 hook bolts, 2 washers, 2 lock washers and 2 nuts	.78
6382	Transformer—Input transformer	3.88
8916	Cone—Reproducer cone—Package of 5	15.00
9423	Coil assembly—Comprising field coil, magnet and cone support	12.15

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RCA Victor Company, Inc.
Camden, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-17-M

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current). Equivalent performance will be obtained with either type of power supply.

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Important—After unpacking the instrument, uncoil the antenna lead and the power cord. Then take off the rear cover (held by two screws through the flange) and *remove the interior packing material used to protect the Radiotrons during shipment.* Before replacing the cover, make certain that all tubes are firmly in the sockets and that the three grid leads are securely connected (by means of the spring contact clips) to the dome terminals of the proper Radiotrons, as shown by the tube location diagram on the bottom of the receiver.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

   Important—When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the foregoing procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

   Note—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

SERVICE DATA

Electrical Specifications

Voltage Rating. . 105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption. . . . . 40 Watts
Frequency Range. . . . . 540 K. C.–1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater, Volts
1. RCA-39 R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 Rectifier	——	——	115	15.0	6.0

*Impossible to measure on ordinary voltmeter.

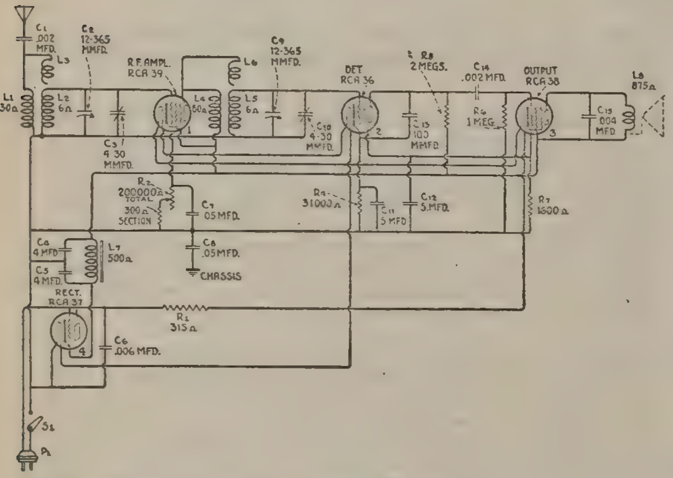

Figure A—Schematic Circuit

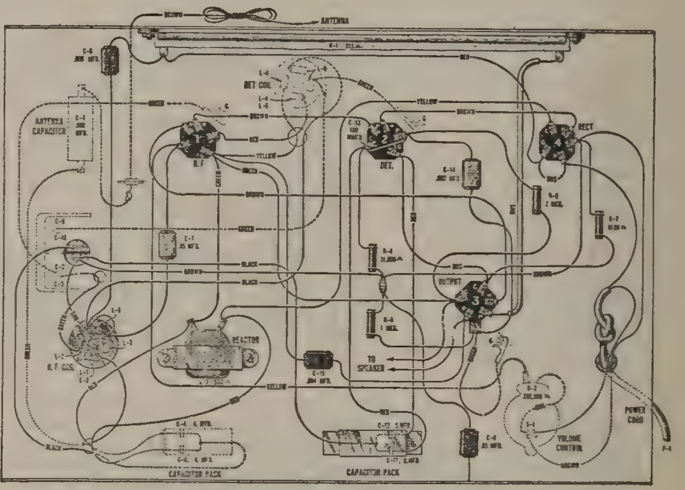

Figure B—Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type—Package of 5	$1.00
3456	Capacitor—.05 mfd.	.44
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	1.10
3537	Reactor—Filter reactor	1.10
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	1.18
3542	Volume control—Complete with mounting nut	1.18
3557	Capacitor—0.002 mfd.	.30
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5	1.00
3560	Resistor—1,600 ohms—Carbon type—½ watt—Package of 5	1.00
3561	Capacitor—0.004 mfd.	.42
3562	Capacitor—0.006 mfd.	.42
3635	Resistor—Filament resistor—315 ohms	1.00
3686	Escutcheon—Volume control escutcheon—Package of 2	.25
3687	Escutcheon—Station selector escutcheon—Package of 2	.25

Stock No.	DESCRIPTION	List Price
3709	Knob—Station selector or volume control knob—Package of 5	$0.65
3714	Coil—Detector coil	.98
3715	Coil—R. F. coil complete	1.08
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
6451	Condenser—Two gang variable tuning condenser	2.04
7484	Socket—Radiotron socket—5 contact	.35
10405	Capacitor—Antenna series capacitor—.002 mfd.	.40
10820	Capacitor—100 mmfd.	.40
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
7594	Cone—Speaker cone—Package of 5	5.00
7595	Support—Cone support	.60
7596	Mechanism—Speaker mechanism complete with magnet	3.00
9426	Loudspeaker complete	4.38

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RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-18-W

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current).

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Preliminary—After unpacking the instrument, remove the antenna lead and the power cord from the rear compartment formed at the top of the cabinet. Then remove the interior packing material (used to protect the Radiotrons during shipment). Refer to the tube location diagram on the license label (located on inside of rear cover), and make certain that all tubes are in position and that the three grid clips are firmly connected to the dome terminals of the proper Radiotrons.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

Antenna Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

Power Supply—Before connecting the power cord to the electrical outlet, make certain (1) that the supply voltage does not exceed 125 volts and (2) that the A. C.–D. C. line switch at the rear of the chassis is correctly set (as indicated on the tube location diagram on the inside of the rear cover)—to the right (facing rear of set) for A. C. and to the left for D. C. supply.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow a minute or two for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

> **Important:** When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the above procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

> **Note 1**—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

> **Note 2**—If the antenna lead is bunched or coiled too near the set, oscillation (indicated by "whistling" on stations) may occur. This condition also may be corrected by reducing the volume control setting. When operated at or near the point of oscillation, however, the sensitivity of the set will be greatly increased—ordinarily to a point in excess of that required for normal reception.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES, OR METAL PARTS INSIDE CABINET.

SERVICE DATA

Electrical Specifications

Voltage Rating. .105–125 Volts, 25–133 Cycles, A. C. or D. C.
Power Consumption.......50 Watts at 115 Volts, 60 Cycles
Frequency Range.........................540–1710 K. C.
Type and Number of Radiotrons—
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total 4
Undistorted Output....................A. C. 0.55 Watts
D. C. 0.15 Watts

This receiver is a four tube A. C.–D. C. table model R. F. type broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, dynamic loudspeaker, excellent performance and compact construction characterize this instrument. Due to the use of a voltage doubling circuit in the rectifier, the receiver has considerably greater output when operated on alternating current than when operated on direct current.

Figures A and B show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles and 115 Volts D. C.

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Filament or Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78, R. F.	2.5	1.5	100	50	200	100	8.0	5.0	6.0
RCA-77, Detector	*5.0	*3.0	95	45	*100	*50	0.2	0.1	6.0
RCA-38, Output	18.0	9.0	180	95	170	90	14.0	7.0	6.0
RCA-25Z5, Rectifier	—	—	—	—	115	—	30.0	20.0	25.0

* Impossible to measure on ordinary voltmeter.

NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

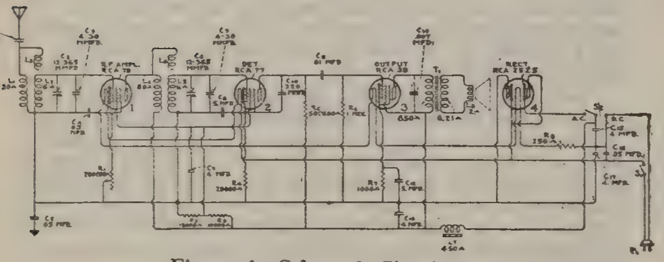

Figure A—Schematic Circuit

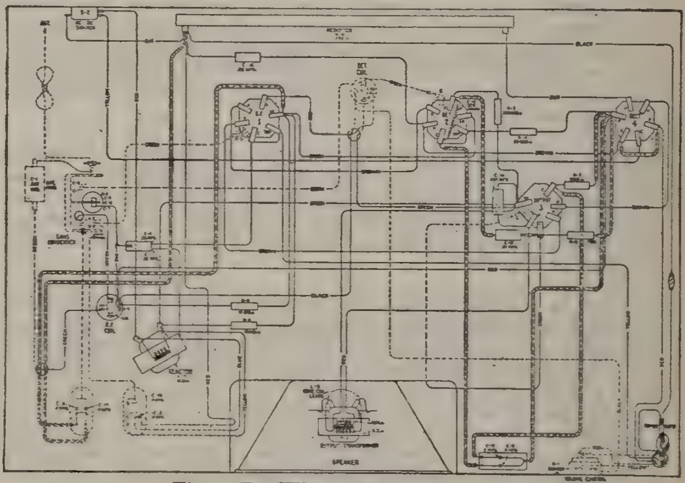

Figure B—Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2731	Resistor—10,000 ohms—Carbon type—1 watt—Package of 5	$1.10
2747	Cap—Contact cap—Package of 5	.50
2981	Capacitor—320 mmfd.	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3066	Resistor—12,000 ohms—Carbon type—1 watt—Package of 5	1.10
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3472	Capacitor—0.0024 mfd.	.32
3536	Capacitor—Filter capacitor—Comprising two 5.0 mfd. capacitors	1.10
3538	Capacitor—Filter capacitor—Comprising two 4.0 mfd. capacitors	1.18
3542	Volume control—Complete with mounting nut	1.18
3567	Escutcheon—Station selector escutcheon—Package of 2	.42
3568	Escutcheon—Volume control escutcheon—Package of 2	.42
3569	Knob—Station selector or volume control knob—Pkge. of 5	.65
3684	Switch—Single pole double throw—Toggle switch	.94
3701	Capacitor—0.01 mfd.	.30
3713	Capacitor—0.05 mfd.	.32
3714	Coil—Detector coil	$0.98
3715	Coil—R. F. coil	1.08
3720	Resistor—250 ohms—Filament resistor	1.00
3721	Resistor—1,000 ohms—Carbon type—½ watt—Package of 5	1.00
3722	Capacitor—Comprising two 0.05 mfd. capacitors	.70
3723	Capacitor—0.007 mfd.	.45
3724	Reactor—Filter reactor	1.10
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6451	Condenser—Two gang variable tuning condenser	2.04
6535	Capacitor—Comprising two 4.0 mfd. capacitors—High voltage	1.25
7484	Socket—Radiotron socket—5 contact	.35
7485	Socket—Radiotron socket—4 contact	.40
10405	Capacitor—Antenna series capacitor—0.002 mfd.	.40
	REPRODUCER ASSEMBLIES—DYNAMIC TYPE	
3610	Magnet	1.04
6477	Transformer—Output transformer	1.32
7598	Cone—Reproducer cone complete—Package of 5	4.35
7599	Housing—Cone housing and cone assembly	1.16
9429	Reproducer—Complete	4.85

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RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23195

Printed in U. S. A.

Instructions for

RCA Victor R-22

115 Volt AC/DC Universal Receiver

INTRODUCTION

This five-tube Superheterodyne receiver is a compact, readily portable instrument which may be operated from any 100 to 125 volt power supply circuit, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current).

The tuning range of this receiver is extended beyond the limits of the regular broadcast band, permitting reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment. The actual range is from 540 to 1712 kilocycles (continuous); an additional range from 2400 to 2500 kilocycles is provided by turning a small knob which operates a frequency band switch.

INSTALLATION

Preliminary—After unpacking the instrument, remove the interior packing material used to protect the Radiotrons in the sockets during shipment. Refer to the tube location diagram on the bottom of the cabinet and make certain that all tubes are rigidly in position and that the three grid clips are firmly connected to the dome terminals of the proper Radiotrons. *The RCA-78 and RCA-6A7 grid leads must be suspended over the notched supports* as indicated in the diagram, in order to obtain proper operation.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

Antenna and Ground—For use as a portable receiver, the attached antenna (flexible black lead approximately 20 feet in length) will normally provide good reception of local and semi-distant stations. The antenna wire should be uncoiled to full length and suspended as high as possible. When the receiver is used in a building of metallic construction an outdoor antenna is essential. In such cases, sufficient pickup may often be obtained by dropping the attached antenna lead out of a nearby window. For any permanent installation, a regulation outdoor antenna from 25 to 75 feet in length is recommended.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe by means of an approved ground clamp. The ground connection to the receiver is made by splicing the required length of flexible insulated copper wire to the short black lead extending from the receiver chassis.

Power Supply—Before connecting the power cord to the electrical outlet, make certain (1) that the supply voltage does not exceed 125 volts and (2) that the A. C.–D. C. line switch at the rear of the chassis is correctly set as indicated in the tube location diagram on the bottom of the cabinet—to the right (facing rear of set) for A. C. and to the left for D. C. supply.

OPERATION

The instrument has three operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Station Selector* (Right-hand Knob—Symmetrical with Volume Control)—This control is provided with an escutcheon upon which is embossed an arbitrary (0–100) graduated scale. Stations of low frequency (540 kilocycles and upward) will be received toward the "100" end of the scale. Police calls from stations transmitting at 1712 kilocycles will be received near the "0" end of the scale.

(3) *Frequency Range Switch* (Small Knob Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, stations operating in the range from 540 to 1712 kilocycles will be received. Reception of police calls from stations in the 2400–2500 kilocycle band will be obtained with this knob in the *clockwise* position.

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (3).
2. Turn on the power and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.
3. Allow a minute or two for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program (or police call) is heard. *If no sounds (station signals or static) are heard on D. C. supply, reverse the prongs of the power plug in the receptacle.*

   NOTE—Police calls in the 2400–2500 kilocycle band will be heard at dial settings between "25" and "50," approximately (each station in this band will be heard at two separate points within this portion of the dial range—the setting which provides the clearer reception should be used). The remainder of the dial range is ineffective with the Frequency Range Switch set for reception of this band. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 2400–2500 kilocycles.

4. For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.
5. When through operating, turn the Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating	100–125 A. C. or D. C.
Frequency Rating (A. C.)	25–133 Cycles
Power Consumption:	A. C. 60 Cycles, 115 Volts—60 Watts D. C. 115 Volts—40 Watts
Number and Types of Radiotrons	1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-25Z5—Total, 5
Undistorted Output (A. C.)	1.5 Watts
Undistorted Output (D. C.)	0.5 Watts
Frequency Range	540–1710 K. C. and 2400–2500 K. C.

This receiver is a five tube Super-Heterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-25Z5 which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

LINE-UP CAPACITOR ADJUSTMENTS

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C. coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points since these R. F. stages act as fixed tuned circuits. Adjust the two high frequency trimmers, located on the lower side of the gang capacitor until maximum output is obtained.

RADIOTRON SOCKET VOLTAGES—115 Volts D. C. or 60 Cycle A. C.
Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator	—	—	—	—	157	88.5	1.7	1.0	6.0
1st Detector	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field
115 Volts, 60 Cycles—185
115 Volts, 25 Cycles—140
115 Volts, D. C.—105

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2963	Resistor—8,000 ohms—Carbon type—1 watt—Package of 5	1.10
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Connected across loudspeaker field	.36
3569	Knob—Station selector and volume control knob—Package of 5	.65
3572	Socket—7 contact Radiotron socket	.38
3584	Ring—Antenna coil shield retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3682	Shield—Radiotron shield body	.22
3683	Shield—Radiotron shield cap	.20
3684	Switch—Toggle type—AC–DC operation	.94
3685	Coil—Choke coil—Second detector plate	.54
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3700	Resistor—450,000 ohms—Carbon type—½ watt—Package of 5	1.00
3701	Capacitor—0.01 mfd.	.30
3702	Capacitor—0.25 mfd.	.42
3710	Capacitor—60 mmfd.	.36
3711	Capacitor—80 mmfd.	.40
3712	Capacitor—400 mmfd.	.40
3713	Capacitor—0.05 mfd.	.32
3725	Capacitor—1,130 mmfd.	$0.50
3752	Shaft—Range switch shaft	.50
3753	Contact—Range switch contact—Package of 2	.40
3755	Capacitor pack—Comprising two 0.1 mfd. and one 0.25 mfd. capacitors	.60
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6464	Transformer—Intermediate frequency transformer	1.88
6505	Reactor—Filter reactor	1.06
6506	Condenser—Three gang variable condenser assembly	3.24
6507	Resistor—180 ohms—Porcelain type	.60
6508	Volume control—Complete with mounting nut	1.36
6510	Capacitor—8.0 mfd.	1.00
6511	Capacitor—Comprising one 8.0 mfd. one 10 mfd. and 4.0 mfd.	1.49
6518	Capacitor—Comprising two 8.0 mfd. capacitors	1.58
6519	Coil—Antenna coil	.88
6520	Coil—R. F. coil assembly	.94
6521	Coil—Oscillator coil assembly	.60
6621	Capacitor pack—Comprising one 0.05 mfd. and one 0.1 mfd. capacitor	.46
7485	Socket—6 contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
6509	Transformer—Output transformer	1.34
7606	Coil assembly—Comprising field coil, magnet and cone support	2.06
8937	Cone—Reproducer cone complete with voice coil—Package of 5	5.00

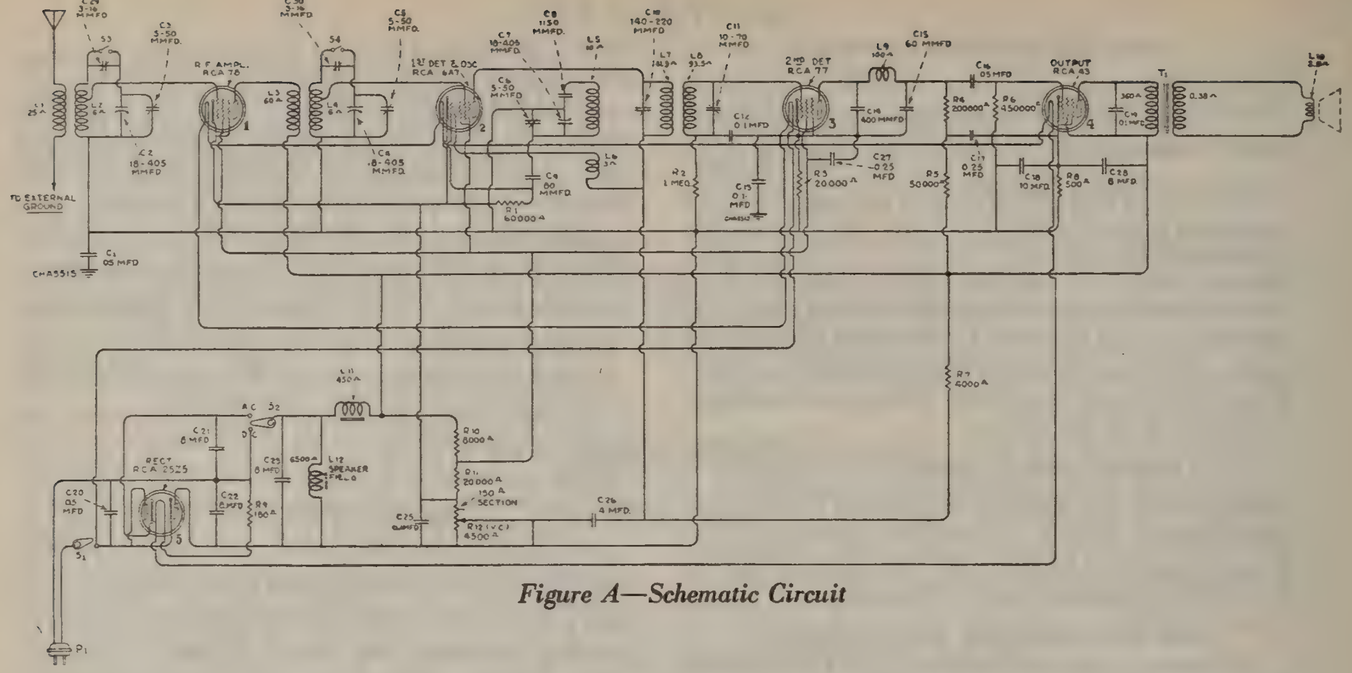

Figure A—Schematic Circuit

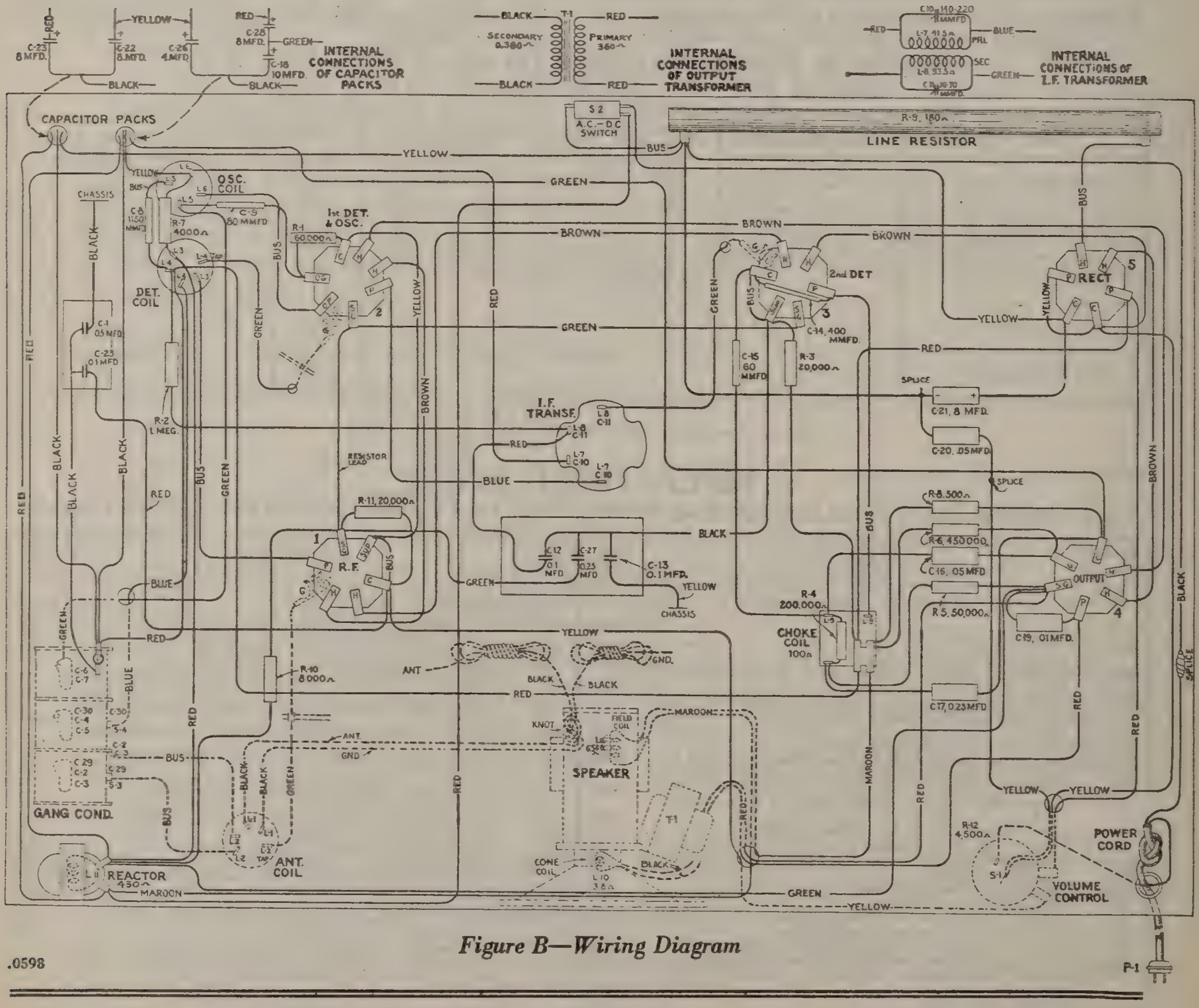

Figure B—Wiring Diagram

RCA Victor Company, Inc.

CAMDEN, NEW JERSEY, U. S. A.

Printed in U. S. A.

Instrucciones para el

Modelo R-25 (DC)

(Corriente Continua, 200/230 Voltios)

Preliminar—Remuévase la parte de atrás del mueble que está sostenida en su lugar por medio de tornillos. *No se haga la conexión del instrumento al enchufe mientras el instrumento esté sin su parte de atrás.* Remuévase el material de empaque de los Radiotrons. Cerciórese de que los Radiotrons estén en sus enchufes respectivos según ilustración en la etiqueta en el chasis del radio. La colocación de los Radiotrons ha de hacerse estrictamente de acuerdo con las instrucciones para evitar que se dañen.

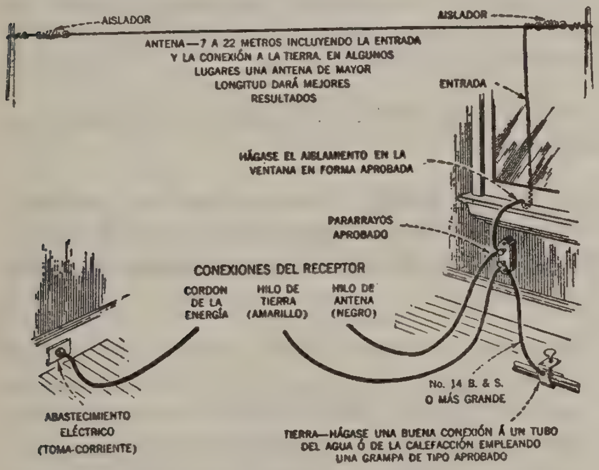
AISLADOR
AISLADOR
ANTENA—7 A 22 METROS INCLUYENDO LA ENTRADA Y LA CONEXIÓN A LA TIERRA. EN ALGUNOS LUGARES UNA ANTENA DE MAYOR LONGITUD DARÁ MEJORES RESULTADOS
ENTRADA
HÁGASE EL AISLAMIENTO EN LA VENTANA EN FORMA APROBADA
PARARRAYOS APROBADO
CONEXIONES DEL RECEPTOR
CORDON DE LA ENERGÍA
HILO DE TIERRA (AMARILLO)
HILO DE ANTENA (NEGRO)
No. 14 B. & S. O MÁS GRANDE
ABASTECIMIENTO ELÉCTRICO (TOMA-CORRIENTE)
TIERRA—HÁGASE UNA BUENA CONEXIÓN Á UN TUBO DEL AGUA Ó DE LA CALEFACCIÓN EMPLEANDO UNA GRAMPA DE TIPO APROBADO

Figura 1

Apriétense firmemente forzándolas hacia abajo las cubiertas protectoras de los Radiotrons señalados por circulos dobles y téngase la completa seguridad de que los tres hilos cortos, flexibles, hayan sido debidamente recortados y ajustados firmemente a los terminales superiores de los Radiotrons RCA-39, según indicaciones que aparecen en la etiqueta de licencia. Vuélvase a colocar la parte de atrás del mueble.

Colocación—Colóquese el instrumento a una distancia conveniente de un enchufe y cerca del alambre de entrada de la antena y de las conexiones de contacto con tierra.

Conexiones—La Figura 1 indica las conexiones externas y el sistema de antena que se recomienda. Es indispensable que se obtenga una buena conexión a tierra. Háganse las conexiones con la antena y tierra en la forma que se ilustra.

Conéctese el cable de la energía del instrumento a una fuente abastecedora de corriente continua dentro de los límites de voltaje especificados en la etiqueta de licencia.

Importante—*Este receptor no funcionará salvo que las espigas del tapón conector sean insertadas en el enchufe en su posición apropiada. La posición correcta ha de hallarse haciendo ensayos.*

Funcionamiento—Refiriéndose a la Figura 2 procédase del modo siguiente:

1. Colóquese el Interruptor en la posición "on" (conectado) hacia la derecha. Varios segundos han de transcurrir para que los Radiotrons se calienten antes que el instrumento empiece a funcionar satisfactoriamente.

2. Colóquese el Regulador del Sonido en poco más o menos el punto medio de su alcance. Luego hágase girar el Selector de Estaciones hacia la izquierda o hacia la derecha hasta que se capte una estación. (La escala del cuadrante está calibrada en kilociclos para facilitar la selección de estaciones que perifonean a una frecuencia conocida.) Si no se ha podido sintonizar ninguna estación, adelántese el Regulador del Sonido hacia la derecha y repítase este medio de sintonizar.

3. Después de haber logrado captar a alguna estación, hágase girar el Regulador del Sonido hacia la izquierda hasta que el sonido quede algo reducido. Luego reajústese el Selector de Estaciones hasta que se obtenga un sonido máximo (con lá graduación correspondiente del Regulador del Sonido). Ajústese el Regulador del Sonido de modo que se obtenga el sonido deseado.

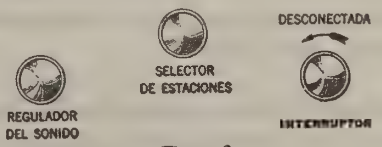

Figura 2

4. Cuando se desee que el instrumento cese de funcionar, colóquese el Interruptor en la posición "off" (desconectado) hacia la izquierda.

Instructions for

Model R-25 (DC)

(200/230 Volts D. C.)

Preliminary—Remove the rear cover which is held by screws. *Do not connect the instrument to the electrical outlet while the back is off.* Remove the packing material from the Radiotrons. Make certain that the Radiotrons are in their proper sockets as illustrated on the rating label on the radio chassis. The arrangement shown must be followed exactly to avoid damage to the Radiotrons.

Press the shield covers down firmly over the Radiotrons shown by double circles, and make sure that the three short flexible leads are clipped securely to the top terminals of the RCA-39 Radiotrons as indicated on the rating label. Replace the rear cover.

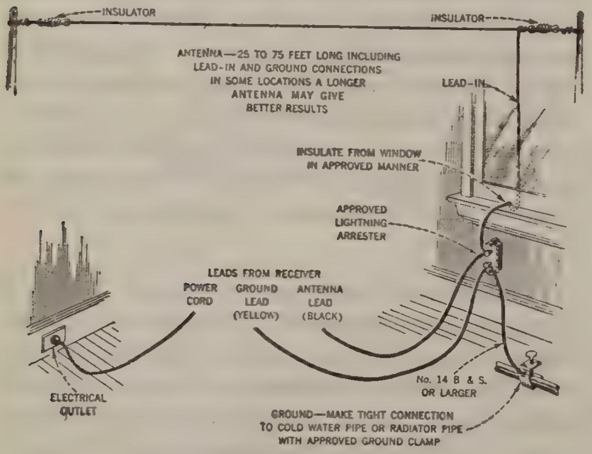
INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
APPROVED LIGHTNING ARRESTER
LEADS FROM RECEIVER
POWER CORD
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
No. 14 B & S. OR LARGER
ELECTRICAL OUTLET
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

Location—Place the instrument near a convenient electrical outlet and near the antenna lead-in and ground connections.

Connections—Figure 1 shows the external connections and the recommended antenna system. A good ground connection is important. Make connections to the antenna and ground as illustrated.

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Connect the instrument power cord to an electrical outlet supplying direct current within the voltage limits specified on the license label.

Important—*This receiver will not operate unless the prongs of the attachment plug are inserted in the outlet in the proper position. The correct position must be determined by trial.*

Operation—Refer to Figure 2, and proceed as follows:

1. Set the On-Off Switch to the "on" position, clockwise. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

2. Set the Volume Control at about the middle of its range. Then turn the Station Selector in either direction until a station is heard. (The dial scale is calibrated in kilocycles to facilitate selecting stations of known frequency.) If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is somewhat reduced. Now readjust the Station Selector until maximum volume (with this setting of the Volume Control) is obtained. Adjust the Volume Control to secure the desired volume.

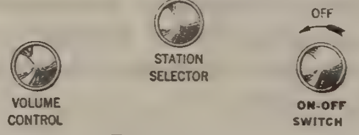

Figure 2

4. When through operating, set the On-Off Switch to the "off" position, counter-clockwise.

SERVICE DATA

Electrical Specifications

Voltage Rating	200–230 Volts
Power Consumption	115 Watts
Radiotrons Required	3 RCA-39, 2 RCA-37, 1 RCA-89—Total 6
Undistorted Output	0.7 Watt
Intermediate Frequency	175 K. C.
R. F. and Oscillator Line-up Frequency	1400 K. C. Only

This receiver is a six tube Super-Heterodyne receiver designed for use on 200–230 volt direct current power lines. Features such as low current Radiotrons, Pentode Output Stage and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are features of this receiver.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers. Line-up adjustments are made with a modulated oscillator and output meter. The I. F. amplifier uses one untuned transformer and one tuned transformer. The I. F. frequency is 175 K. C. and the line-up capacitors should be adjusted for maximum output at this frequency. The three gang capacitor trimmers are adjusted for maximum output when the dial and oscillator are both set at 1400 K. C.

Figure A shows the schematic wiring and Figure B the chassis wiring. The voltage readings and the replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Heater or Filament, Volts	Radiotron Socket Voltages
1. R. F. RCA-39	3.5	90	205	5.0	6.0	
2. 1st Detector RCA-39	10	83	200	1.0	6.0	
3. Oscillator RCA-37	—	—	90	4.5	6.0	
4. I. F. RCA-39	3.5	90	205	5.0	6.0	
5. 2nd Detector RCA-37	20	—	185	.75	6.0	
6. Power RCA-89	18.5	190	180	15.0	6.0	

All above voltages measured at maximum volume control setting with no signal impressed on input. 220 Volt, D. C. source used.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2532	Capacitor—230 mmfd.—Package of 5	$2.50
2731	Resistor — 10,000 ohms — Carbon type — 1 watt—Package of 5	1.10
2746	Socket—Pilot lamp socket	.20
3076	Resistor — 1 megohm — Carbon type — ½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt—Package of 5	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt—Package of 5	1.00
3384	Capacitor—650 mmfd.—Located on detector and oscillator coil—Package of 5	1.50
3461	Coil—Second detector plate choke coil	.88
3471	Capacitor—0.025 mfd.	.32
3472	Capacitor—0.0024 mfd.	.32
3517	Switch—Double pole—Single throw	1.50
3518	Shaft—Tuning condenser drive shaft	.50
3519	Resistor — 9,000 ohms — Carbon type — 3 watts	.25
3520	Resistor—Porcelain type—Wire wound—322 ohms—Tapped at 22 ohms	.88
3566	Socket—Radiotron 5 contact socket	.50
3608	Resistor—720 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor — 6,000 ohms — Carbon type — ½ watt—Package of 5	1.00
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5	1.00
6421	Transformer—Audio transformer assembly—Comprising interstage and output transformer in metal container	3.68
6422	Capacitor assembly—Comprising two 4.0 mfd., two 0.5 mfd., one 0.25 mfd., one 0.1 mfd. and one 0.05 mfd. capacitors in metal container	$4.04
6423	Transformer—First intermediate frequency transformer	2.84
6424	Transformer—Second intermediate frequency transformer	2.20
6425	Coil—Detector and oscillator coil	2.65
6426	Coil—R. F. coil	.95
6427	Scale—Dial scale and drum	.50
6428	Resistor — Porcelain type — 995 ohms — Tapped at 290 ohms	.80
6468	Volume control—Complete with mounting nut	1.25
7054	Cord—Power cord	.60
7241	Condenser—3 gang variable tuning condenser assembly	4.00
7485	Socket—Radiotron 6 contact socket	.40
7496	Shield—Radiotron tube shield	.25
7518	Reactor—Filter reactor	2.30
	REPRODUCER ASSEMBLIES	
3005	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets	.50
6184	Board—Terminal board with three terminals—Package of 5	.50
7442	Cone—Reproducer cone complete—Package of 5	5.00
8702	Ring—Cone retaining ring	.50
8977	Coil assembly—Comprising field coil, cone bracket and magnet	3.35

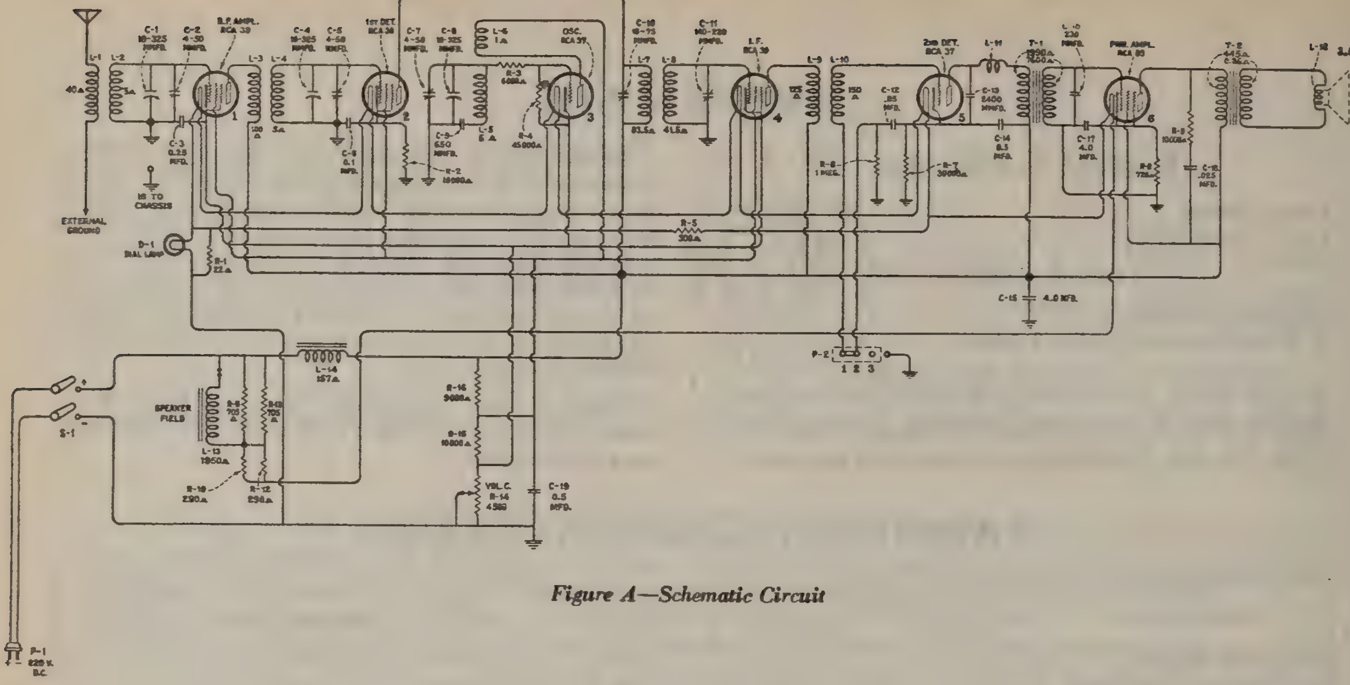

Figure A—Schematic Circuit

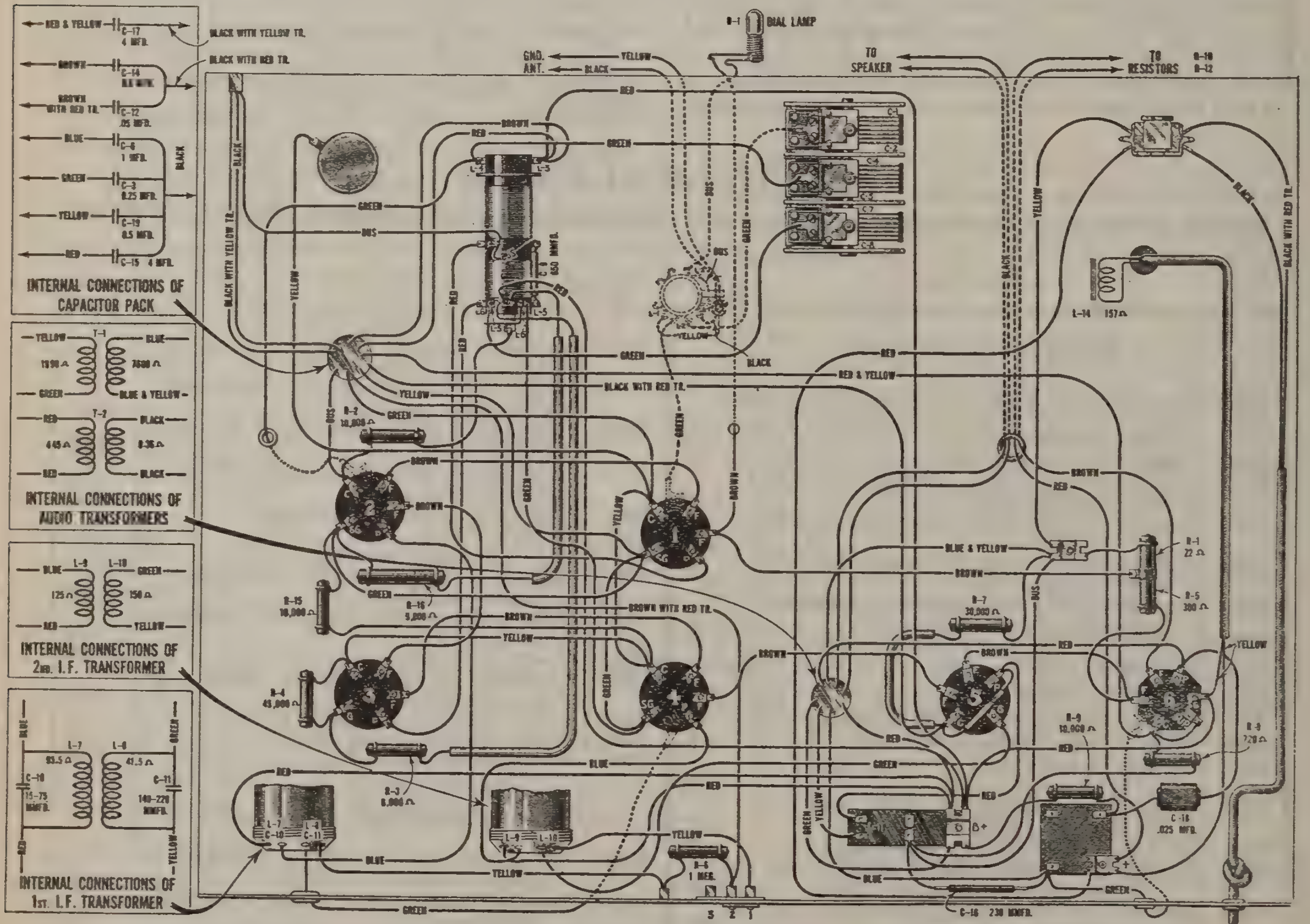

Figure B—Chassis Wiring Diagram

C-13 2400 MMFD. CONNECTED FROM SOCKET NO. 5C TOP

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RCA Victor Company, Inc.
Camden, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-27

115 Volt AC/DC Universal Receiver

INTRODUCTION

This four-tube radio receiver is an extremely compact and readily portable instrument which is operable from any 100 to 125 volt power mains, either A. C. (alternating current—any frequency from 25 to 133 cycles per second) or D. C. (direct current). Equivalent performance will be obtained with either type of power supply.

An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standarized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Preliminary—After unpacking the instrument, remove the antenna lead and the power cord from their respective rear compartments formed at the top of the cabinet. Then remove the interior packing material (used to protect the Radiotrons during shipment.) Refer to the tube location diagram on the license label (located on inside of rear cover). and make certain that all tubes are in position and that the three grid clips are firmly connected to the dome terminals of the proper Radiotrons.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possible more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

> **Important:** When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the above procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

> Note 1—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.
>
> Note 2—If the antenna lead is bunched or coiled too near the set, oscillation (indicated by "whistling" on stations) may occur. This condition also may be corrected by reducing the volume control setting. When operated at or near the point of oscillation, however, the sensitivity of the set will be greatly increased—ordinarily to a point in excess of that required for normal reception.

4. When through operating turn off the power by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

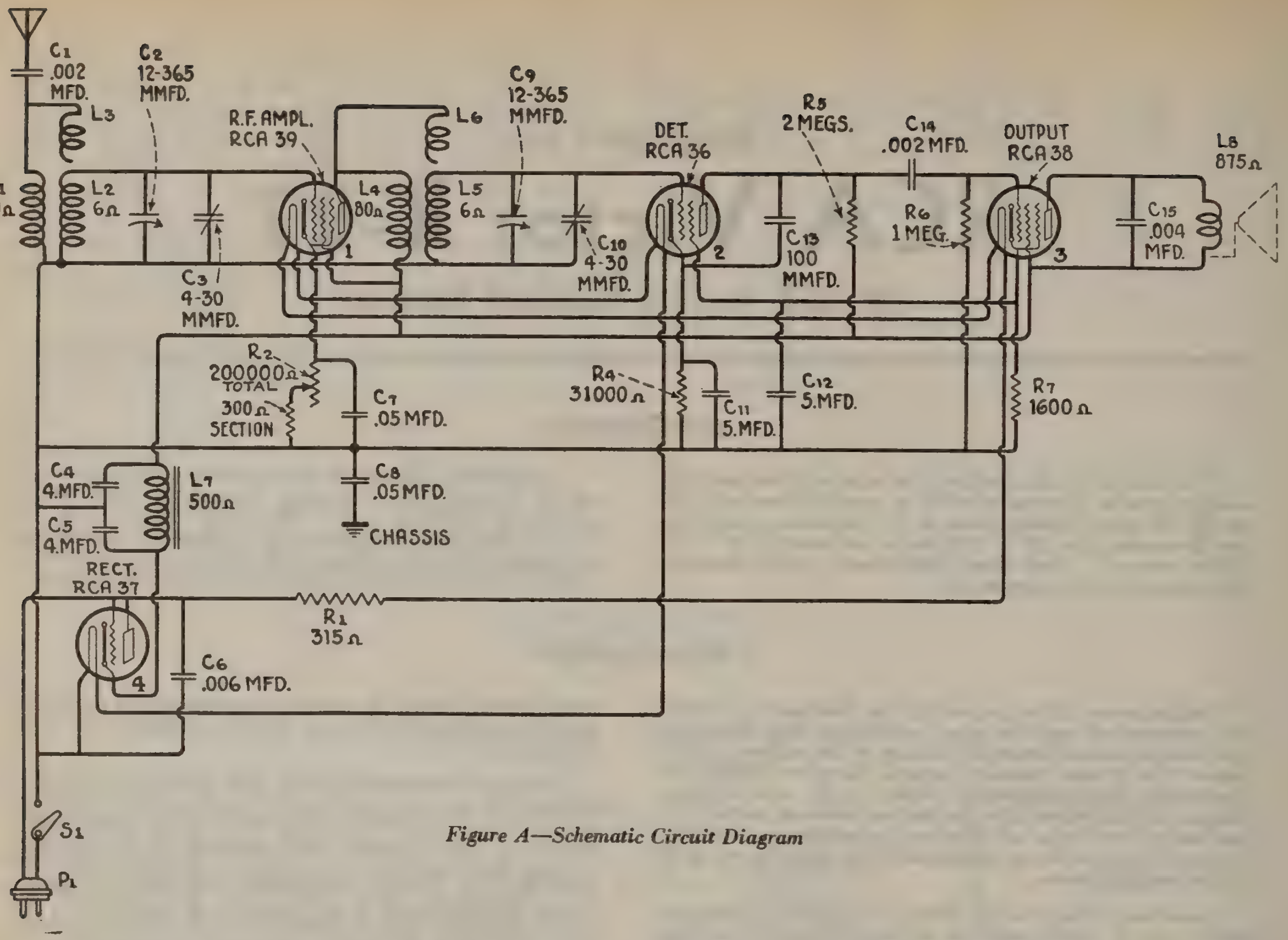

Figure A—Schematic Circuit Diagram

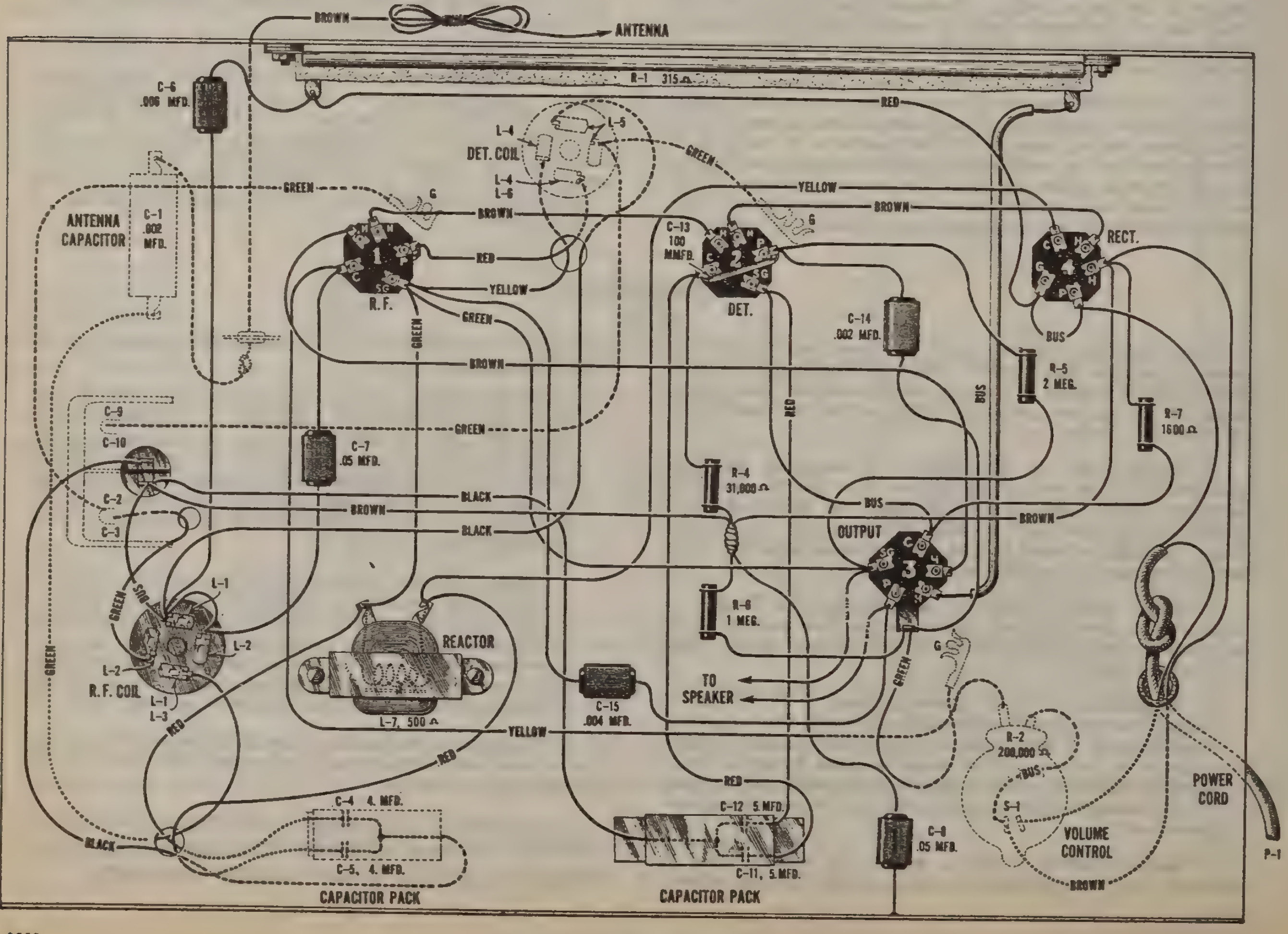

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Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating. .105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption............................40 Watts
Frequency Range...................540 K. C.–1700 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation of both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line

All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	5	6.0
4. RCA-37 Rect.	—	—	115	15	6.0

*Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

(Replacement parts may be purchased from authorized Distributors or Dealers only)

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type—Package of 5	$2.50
3456	Capacitor—.05 mfd.	.44
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors	1.10
3537	Reactor—Filter reactor	1.10
3538	Capacitor—Filter capacitor—Two 4.0 mfd.	1.18
3539	Coil—R. F. coil complete	1.08
3540	Coil—Detector coil	.98
3541	Resistor—Filament resistor—315 ohms	1.00
3542	Volume control—Complete with mounting nut	1.18
3557	Capacitor—0.002 mfd.	.30
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5	1.00
3560	Resistor — 1,600 ohms — Carbon type— ½ watt—Package of 5	1.00
3561	Capacitor—0.004 mfd.	$0.42
3562	Capacitor—0.006 mfd.	.42
3567	Escutcheon—Station selector escutcheon	.42
3568	Escutcheon—Volume control escutcheon	.42
3569	Knob—Station selector or volume control knob—Package of 5	.65
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	2.00
6451	Condenser—Two gang variable tuning condenser	2.04
7484	Socket—Radiotron socket—5 contact	.65
10405	Capacitor—Antenna series capacitor—.002 mfd.	.50
10820	Capacitor—100 mmfd.	.50
	REPRODUCER ASSEMBLIES	
9426	Reproducer—Complete	4.38

.0555

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

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115 Volt AC/DC Universal Receiver

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An additional feature of this instrument is found in the use of a tuning range extended beyond the limits of the standardized broadcast band. The actual range is from 540 to 1710 kilocycles, permitting the reception of unusual and oftentimes interesting forms of intelligence (such as police calls) in addition to conventional broadcast entertainment.

INSTALLATION

Preliminary—After unpacking the instrument, remove the antenna lead and the power cord from their respective rear compartments formed at the top of the cabinet. Then remove the interior packing material (used to protect the Radiotrons during shipment). Refer to the tube location diagram on the license label (located on inside of rear cover), and make certain that all tubes are in position and that the three grid clips are firmly connected to the dome terminals of the proper Radiotrons.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired.

In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the set resting upon a soft cloth pad or with the back of the set fitted into a small compartment or placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device. It must be mounted only in an upright position as intended to insure proper ventilation and maximum tube life.

External Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead, but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window, since such structures form an effective shield which greatly impedes the passage of radio waves.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by inserting the plug connector at the end of the power cord in the intended electrical outlet and by then turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the Radiotron filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard.

> **Important:** When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the above procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position mid-way between the points where the signal disappears.

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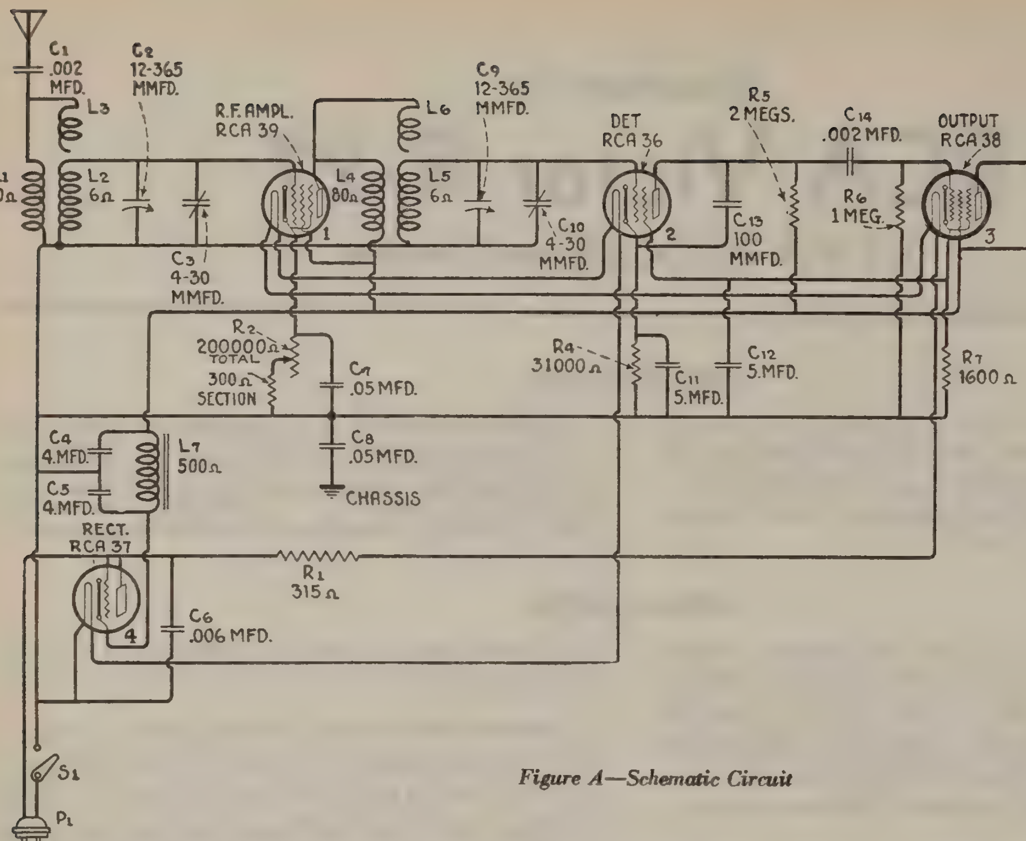

Figure A—Schematic Circuit

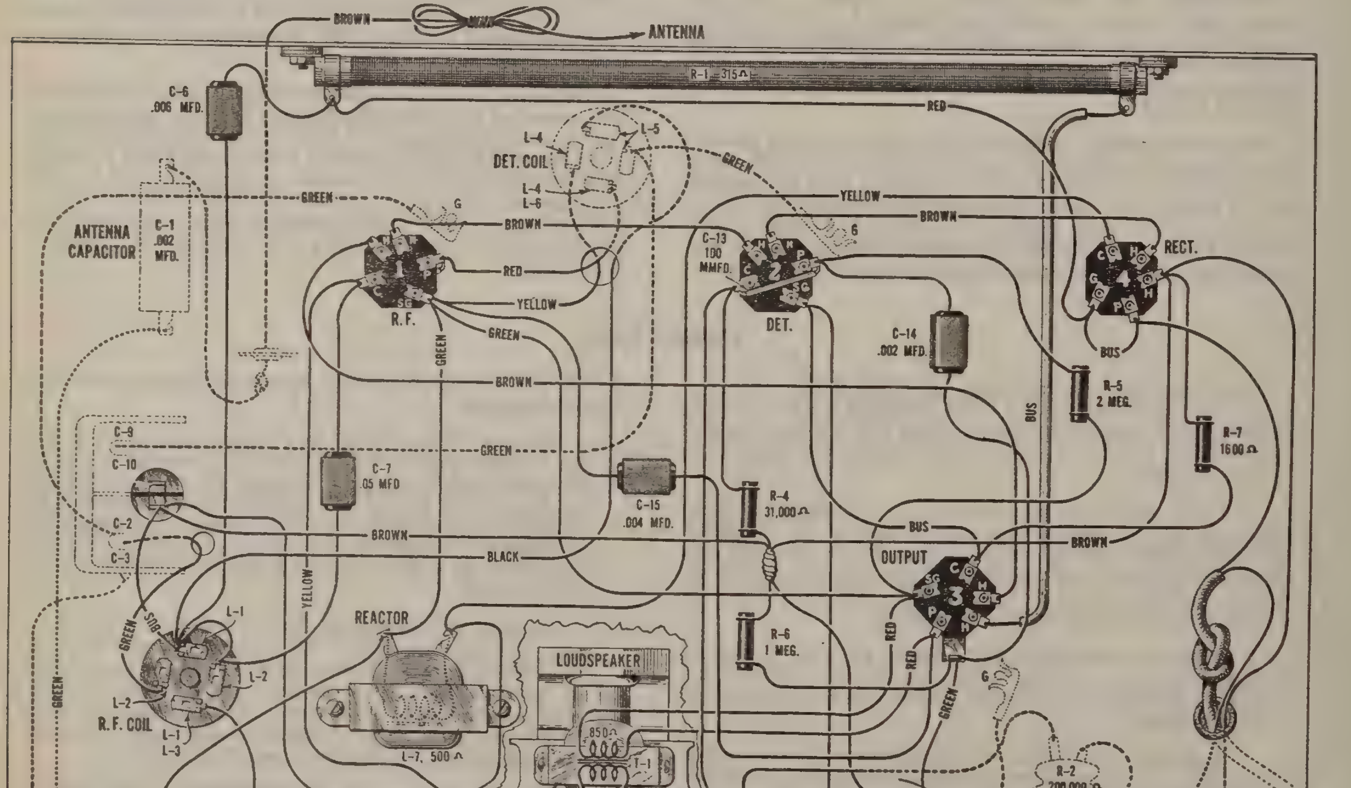

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating. .100–125 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption. . . . . .40 Watts
Frequency Range. . . . . .540 K. C.–1710 K. C.
Type and Number of Radiotrons—
1 RCA-36, 1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.–D. C. table model tuned R. F. broadcast receiver. Features such as universal operation on both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line

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Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current, M. A.	Filament or Heater, Volts
1. RCA-39 R. F.	3.0	105.0	105	7.0	6.0
2. RCA-36 Detector	*0.75	11.0	*60	0.025	6.0
3. RCA-38 Output	11.0	100.0	95	5.0	6.0
4. RCA-37 Rectifier	——	——	115	15.0	6.0

*Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type—Package of 5.	$1.00
3536	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors.	1.10
3537	Reactor—Filter reactor.	1.10
3538	Capacitor—Filter capacitor—Two 4.0 mfd. . .	1.18
3542	Volume control—Complete with mounting nut.	1.18
3557	Capacitor—0.002 mfd.	.30
3559	Resistor—31,000 ohms—Carbon type—½ watt—Package of 5.	1.00
3560	Resistor — 1,600 ohms — Carbon type — ½ watt—Package of 5.	1.00
3561	Capacitor—0.004 mfd.	.42
3562	Capacitor—0.006 mfd.	.42
3567	Escutcheon—Station selector escutcheon—Package of 2.	.42
3568	Escutcheon—Volume control escutcheon—Package of 2.	.42
3569	Knob—Station selector or volume control knob—Package of 5.	.65
3635	Resistor—Filament resistor—315 ohms.	$1.00
3713	Capacitor—0.05 mfd.	.32
3714	Coil—Detector coil.	.98
3715	Coil—R. F. coil complete.	1.08
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5.	1.00
6451	Condenser—Two-gang variable tuning condenser.	2.04
7484	Socket—Radiotron socket—5-contact.	.35
10405	Capacitor—Antenna series capacitor—0.002 mfd.	.40
10820	Capacitor—100 mmfd.	.40
	REPRODUCER ASSEMBLIES DYNAMIC TYPE	
3610	Magnet.	1.04
6477	Transformer—Output transformer.	1.32
7598	Cone—Reproducer cone complete—Package of 5.	4.35
7599	Housing—Cone housing and core assembly. .	1.16
9429	Reproducer—Complete.	4.85

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-27

Four-Tube, 115-Volt AC/DC (Universal) Receiver

INSTALLATION

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired. In any installation, however, care should be taken to avoid restriction of natural ventilation as would occur with the set resting upon or placed close to a radiator or other heating device.

Antenna—The proper length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna (flexible black lead approximately 20 feet in length) when removed from the cabinet and fully extended will provide satisfactory pickup in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead.

Improved pickup for distant reception may be obtained by connecting the end of the antenna wire to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is installed in a building of metallic construction, the shielding effect of that structure will greatly impede the passage of radio waves; hence, far better results ordinarily will be obtained with the attached wire either dropped out of a near-by window or connected to an outdoor antenna.

Power Supply—Connect the power cord to an electrical outlet upon which is impressed a supply voltage (either A. C. —alternating current or D. C.—direct current) between the limits specified on the rating label attached to the inside of the rear panel of the cabinet. Never operate the instrument from any voltage exceeding the maximum limit (125 volts). Consult your local power company if you are in doubt as to the actual voltage available.

> NOTE—The power cord is of special construction and should not be shortened, tampered with, bent sharply or replaced with standard cord. It is normal for this cord to become slightly warm during operation of the receiver. If, at any time, the receiver fails to operate and the cord does not become properly warm, return the complete instrument to your dealer for installation of a new cord of the same type.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in their sockets. The set therefore is ready to operate when it is removed from the carton and external connections are made as heretofore described.

If, when first installed, the receiver either performs imperfectly or fails to operate, it is probable that one or more of the tubes or dome terminal (grid) clips have been jarred loose in shipment. Remove the cabinet rear panel (held in place by screws at the edges), then refer to the tube location diagram printed on the rating label and make certain that all tubes are pressed down firmly in their respective sockets and that the three grid clips are tightly attached to the dome terminals of the proper tubes.

OPERATION

Two operating controls only are used, both appearing upon the cabinet front panel. The left-hand knob is a combined volume control and power switch and the knob at the right is the station selector. The instrument should be operated as follows:

1. Apply power to the receiver by turning the left-hand knob clockwise from the "off" position of the switch. A definite "snap" should be heard at first, further rotation of the knob serving to increase the volume as required.

2. Allow approximately 30 seconds for the tube filaments to heat. Then, with the volume control fully advanced, proceed to rotate the station selector slowly until a signal is heard. Stations in the standard broadcast band (540–1500 kilocycles) will be received between dial settings of "100" and "10," approximately; police calls transmitted at frequencies up to 1712 kilocycles will be received near the "0" end of the scale.

> **IMPORTANT:** When operating from a D. C. power supply, reception will be possible only with the connector plug inserted in that position which provides the correct polarity to the set. If no sound is heard from the loudspeaker (signal or static interference), reverse the position of the connector plug in the outlet and repeat the above procedure.

3. Upon receiving a signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position midway between the points where the signal disappears.

> NOTE 1—When tuned to a strong local station with the volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of the control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the volume control below the readily-apparent critical point.

> NOTE 2—If the antenna lead is bunched or coiled too near the set, oscillation (indicated by "whistling" on stations) may occur. This condition also may be corrected by reducing the volume-control setting. When operated at or near the point of oscillation, however, the sensitivity of the set will be greatly increased—ordinarily to a point in excess of that required for normal reception.

4. When through operating, turn the power "off" by rotating the volume control counter-clockwise until the "snap" of the power switch is heard.

CAUTION: DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.

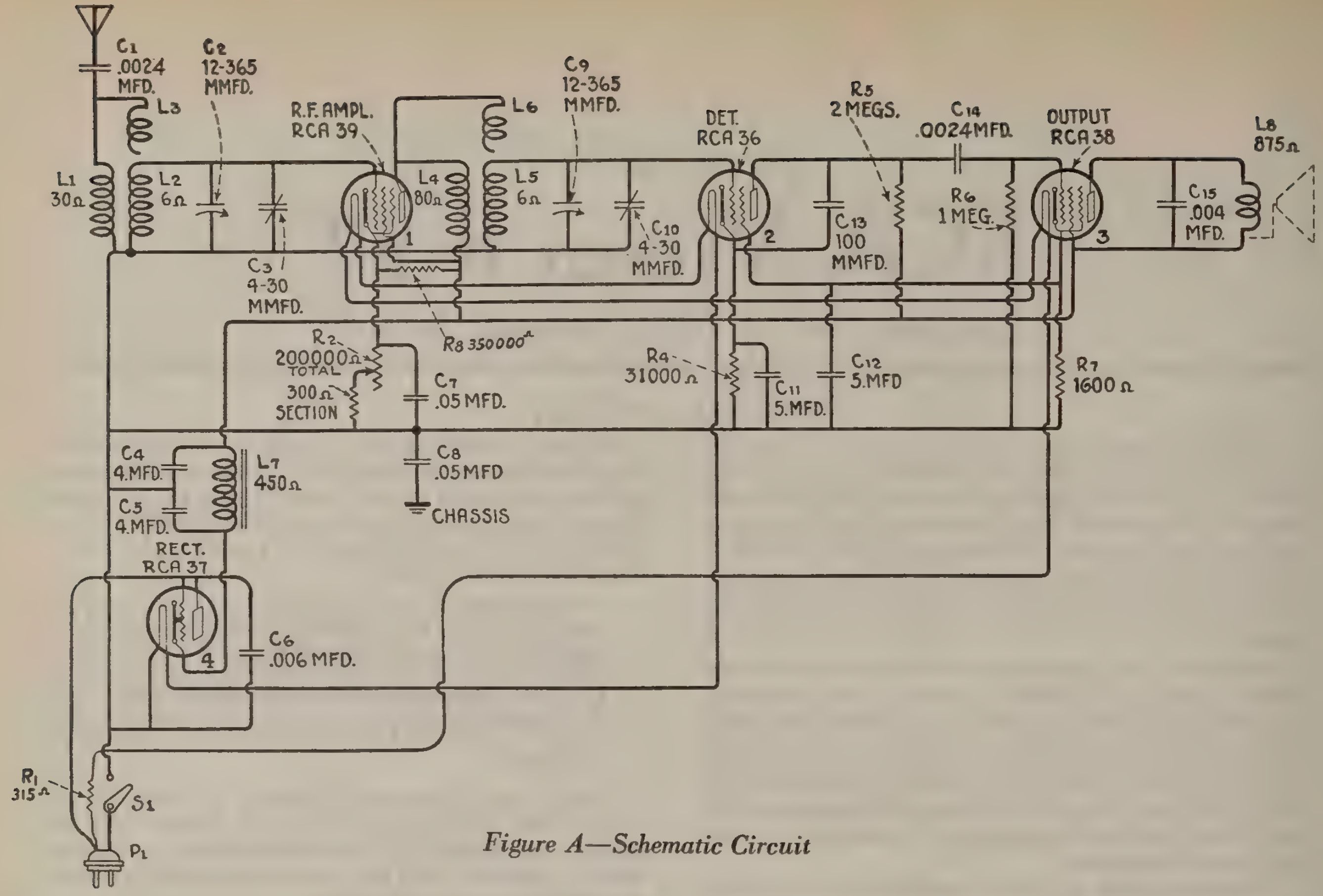

Figure A—Schematic Circuit

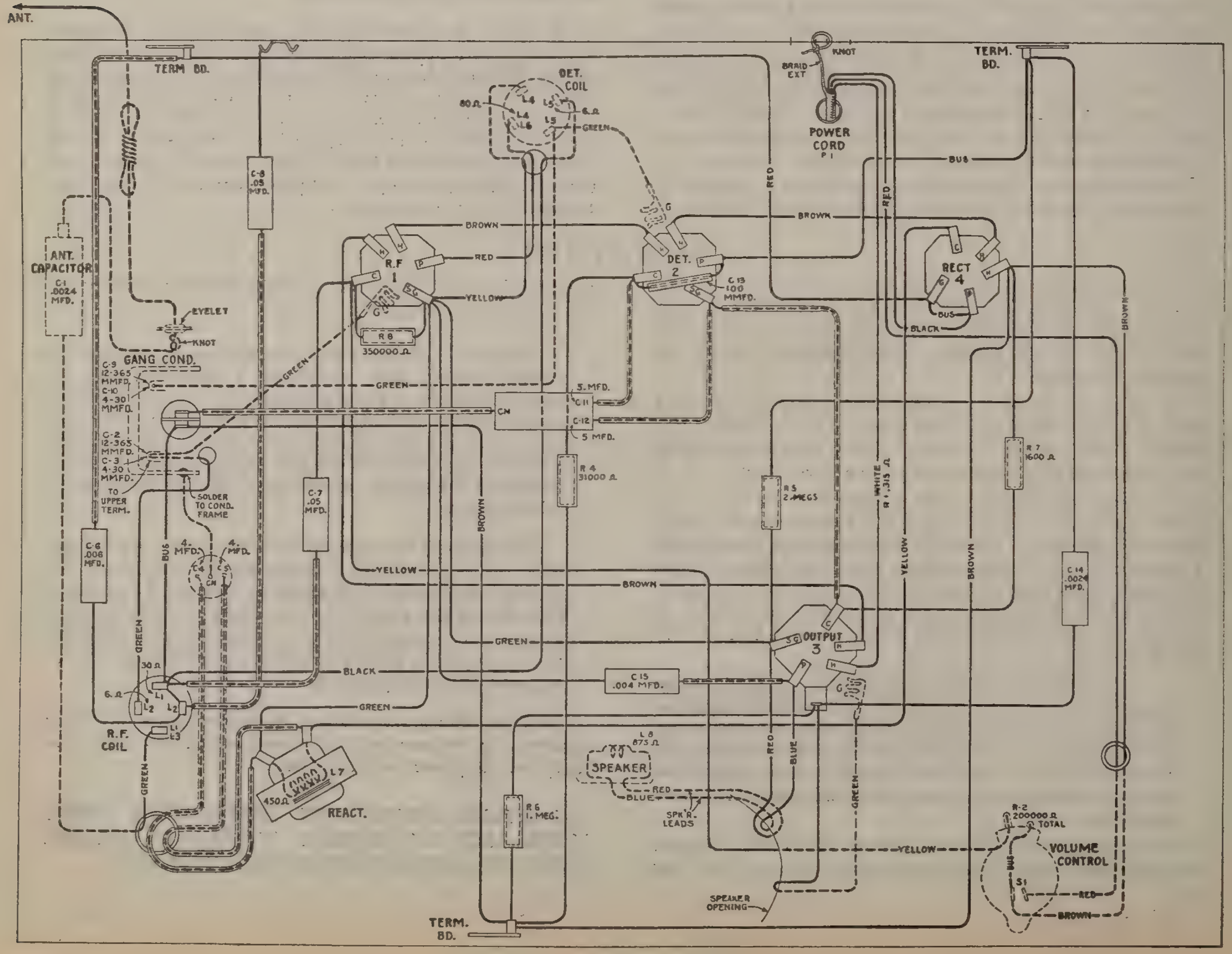

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating—
105–120 Volts, 25–133 Cycles A. C. or D. C.
Power Consumption....................40 Watts
Frequency Range...........540 K. C.–1712 K. C.
Type and Number of Radiotrons.......1 RCA-36,
1 RCA-37, 1 RCA-38, 1 RCA-39—Total 4

This receiver is an A. C.-D. C. table model tuned R. F. broadcast receiver. Features such as universal operation of both A. C. and D. C., wide tuning range, excellent performance and compact construction characterize this instrument. Figures A and B show the schematic and wiring diagrams respectively. The voltage readings and replacement parts are given below.

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volt A. C. Line
All Voltages on D. C. will be slightly lower

Radiotron No.	Cathode or Filament to Control Grid, Volts	Cathode or Filament to Screen Grid, Volts	Cathode or Filament to Plate, Volts	Plate Current M. A.	Filament or Heater Volts
1. RCA-39 R. F.	3.0	105	105	7.0	6.0
2. RCA-36 Det.	*0.75	11.0	*60	.025	6.0
3. RCA-38 Output	11.0	100	95	5	6.0
4. RCA-37 Rect.	—	—	115	15	6.0

* Impossible to measure on ordinary voltmeter

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3076	Resistor—1 megohm—Carbon type (R6)—Package of 5..........................	$1.00
3537	Reactor—Filter reactor (L7)..............	1.10
3542	Volume control—Complete with mounting nut (R2, S1).........................	1.18
3559	Resistor—31,000 ohms—Carbon type—½ watt (R4)—Package of 5................	1.00
3560	Resistor — 1,600 ohms — Carbon type — ½ watt (R7)—Package of 5...............	1.00
3567	Escutcheon — Station selector escutcheon—Package of 2..........................	.42
3568	Escutcheon — Volume control escutcheon—Package of 2..........................	.42
3569	Knob—Station selector or volume control knob—Package of 5.....................	.65
3713	Capacitor—0.05 mfd. (C7, C8)............	.32
3714	Coil—Detector coil (L4, L5, L6)...........	.98
3715	Coil—R. F. coil complete (L1, L2, L3)......	1.08
4007	Capacitor—2,400 mmfd. (C1, C14).........	.35
4070	Capacitor—0.004 mfd. (C15)...............	.42
4071	Capacitor—0.006 mfd. (C6)................	$0.42
4073	Resistor—350,000 ohms—Carbon type—½ watt—(R8)—Package of 5...............	1.00
6188	Resistor—2 megohm—Carbon type—½ watt (R5)—Package of 5......................	1.00
6451	Condenser—2-gang variable tuning condenser (C2, C3, C9, C10)................	2.04
6819	Resistor—Filament resistor—Power cord—315 ohms (R1).........................	1.00
6844	Capacitor—Filter capacitor—Two 5.0 mfd. capacitors (C11, C12)..................	1.10
6845	Capacitor—Filter capacitor—Two 4.0 mfd. (C4, C5).............................	1.18
7484	Socket—Radiotron socket—5-contact.......	.35
10820	Capacitor—100 mmfd. (C13)...............	.40
	LOUDSPEAKER ASSEMBLIES—MAGNETIC TYPE	
7594	Cone—Speaker cone—Package of 5.........	5.00
7595	Support—Cone support....................	.60
7596	Mechanism—Speaker mechanism complete with magnet (L8)......................	3.00
9426	Loudspeaker complete.....................	4.38

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-28

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet. To prevent damage to the cabinet finish and possible internal injury, the instrument should not be placed on a radiator or too close to a source of heat. It must be mounted only in the normal upright position, so as to insure proper ventilation and maximum life of the tubes. Particularly if the cabinet is of the small box or chest type, care should be taken to avoid restriction of natural ventilation as would occur with the set fitted into a small compartment or backed up too close to a wall or other vertical plane surface.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set is therefore ready to operate when it is removed from the carton and external connections are made as described in the foregoing. The corrugated-paper covers, used to protect the tubes during shipment, should be removed before operating the set.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Refer to the tube location diagram on the rating label and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

> NOTE: On closed-back models, it will be necessary to take off the rear cover of the cabinet in order to remove the corrugated-paper tube covers and to inspect the tube installation as outlined above. Because of the small clearance above the tubes on some models, the chassis must be entirely removed from the cabinet in order to test or replace the Radiotrons. To permit withdrawal of the chassis, it is necessary to take off the three knobs on the front panel and remove the four bolts through the bottom of the cabinet. When it is desired to have the tubes tested in one of these models, it is recommended that the complete instrument be taken to a reputable dealer, who will generally be glad to remove and test the Radiotrons without charge except for necessary tube replacements.

OPERATION

The instrument has three operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Tone Range Switch* (Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.

(3) *Station Selector* (Right-hand Knob)—This control is equipped with an illuminated dial, graduated in kilocycles to facilitate location and identification of stations.

To operate the receiver, proceed as follows:

1. Turn on the power and set the Volume Control fully clockwise for maximum volume.

2. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

3. For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the station Selector—for regulation of volume.

4. Set the Tone Range Switch for the preferred tone quality.

5. When through operating, turn the Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

SERVICE DATA

Voltage Rating..............................115 Volts
Frequency Rating...........25–40 Cycles and 50–60 Cycles
Power Consumption............................70 Watts
Number and Types of Radiotrons...............1 UX-280,
1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output............................1.75 Watts
Frequency Range..................540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2749	Capacitor—2,400 mmfd.	.35
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5.	.40
3592	Knob—Station selector, operating switch or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5.	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	.30

Stock No.	DESCRIPTION	List Price
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	$0.40
3615	Knob—Tone control knob—Package of 5	.60
6228	Resistor—200,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
6473	Scale—Dial scale assembly	.50
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—3 gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10 mfd.	1.40
8985	Transformer—Power transformer—105–125 volts—50–60 cycles	4.26
8986	Transformer — Power transformer — 200–250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support	2.35

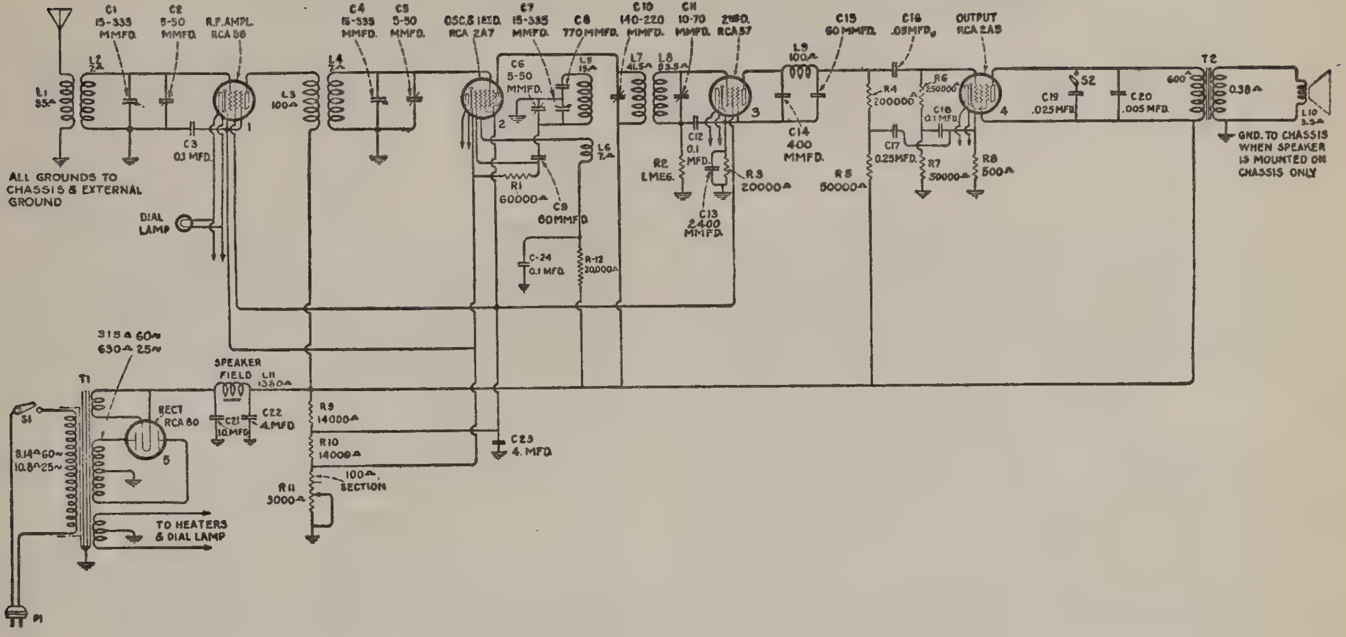

Figure 1—Schematic Circuit Diagram

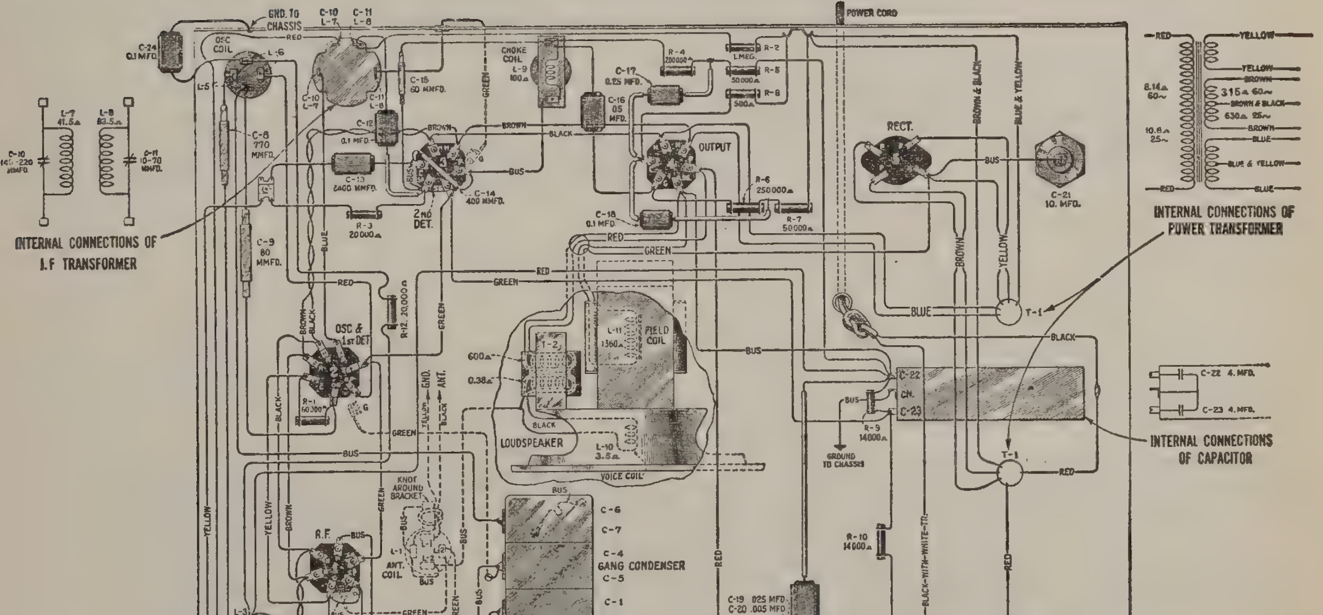

Figure 2—Wiring Diagram

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-28-BW

INSTALLATION

Preliminary—After unpacking the instrument, remove the interior packing material used to protect the Radiotrons during shipment. Refer to the tube location diagram on the license label inside the cabinet, and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the license label.

OPERATION

The instrument has three operating controls, located on the right-hand side of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Uppermost Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Tone Range Switch* (Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.

(3) *Station Selector* (Lowest Knob)—This control is equipped with an illuminated dial, graduated in kilocycles to facilitate location and identification of stations.

To operate the receiver, proceed as follows:

1. Turn on the power and set the Volume Control fully clockwise for maximum volume.

2. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

3. For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.

4. Set the Tone Range Switch for the preferred tone quality.

5. When through operating, turn the Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

SERVICE DATA

Voltage Rating..............................105–125 Volts
Frequency Rating............25–40 Cycles and 50–60 Cycles
Power Consumption..............................70 Watts
Number and Types of Radiotrons...............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output..........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	725 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2749	Capacitor—2,400 mmfd.	.35
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3586	Scale—Dial scale	.50
3587	Socket—Dial lamp socket and bracket	.32
3588	Volume control—Complete with mounting nut	1.40
3589	Switch—Tone control switch	.54
3592	Knob—Station selector, operating switch or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	$0.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6443	Capacitor—10 mfd.	1.50
6464	Transformer—I. F. transformer	1.88
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7592	Condenser—3 gang variable tuning condenser	3.35
8985	Transformer—Power transformer—105–125 volts—50–60 cycles	4.26
8986	Transformer — Power transformer — 200–250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9004	Coil assembly—Comprising field coil, magnet and cone support	2.35

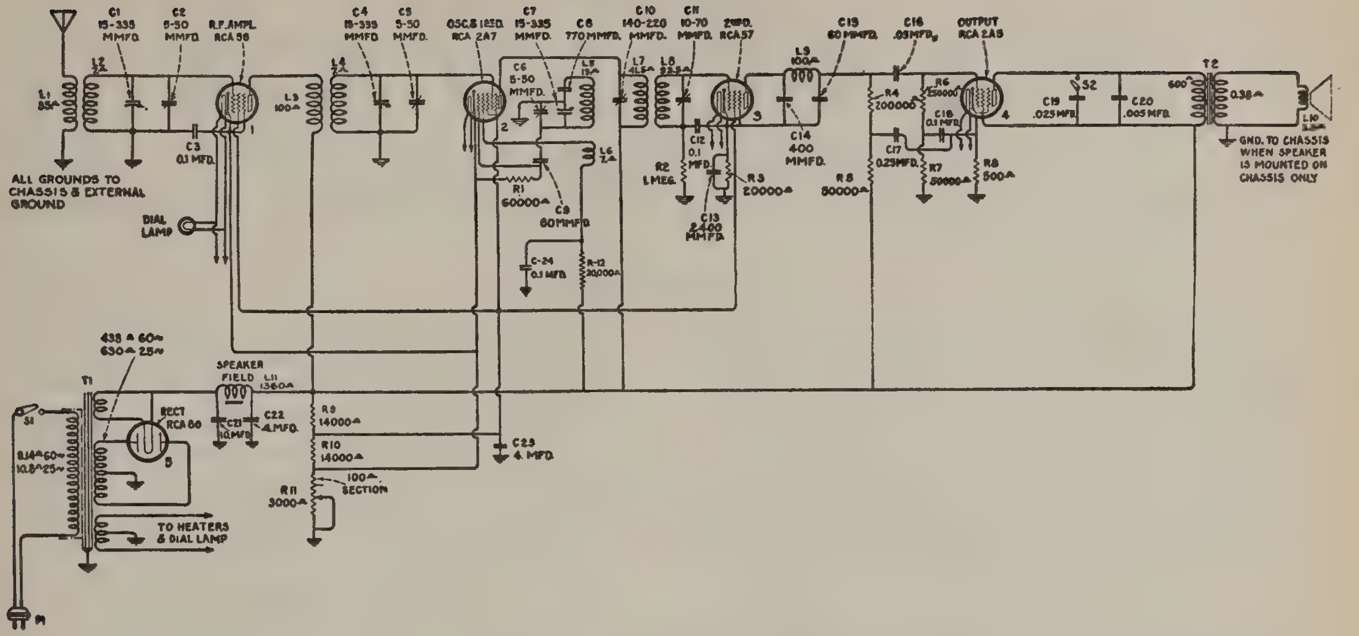

Figure 1—Schematic Circuit Diagram

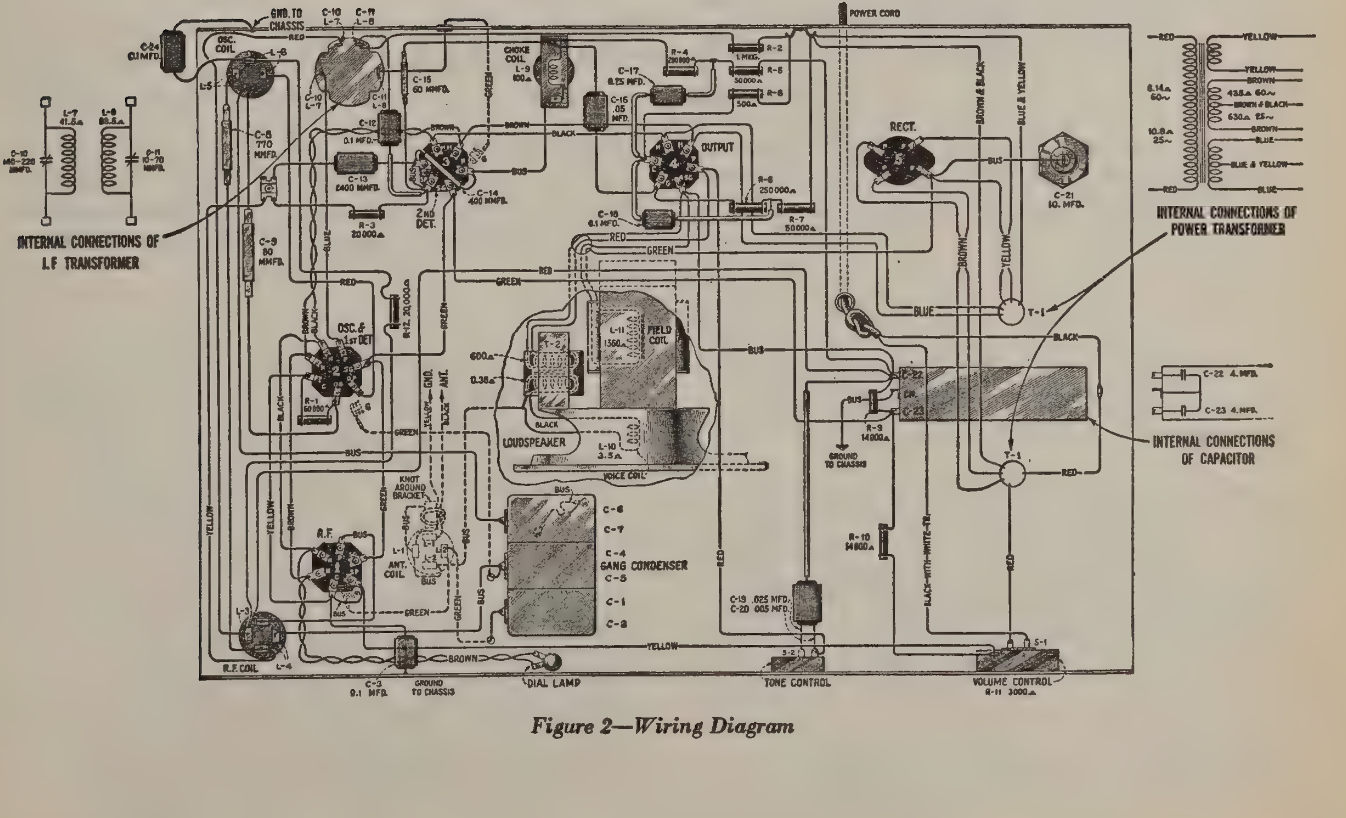

Figure 2—Wiring Diagram

REG. U. S. PAT. OFF.

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23176

Printed in U. S. A.

Instructions for

RCA Victor R-28-BWC

Five-Tube Superheterodyne Receiver

INSTALLATION

Preliminary—After unpacking the instrument, take off the rear panel (held by screws) to obtain access to the upper portion of the chassis. Remove the interior packing material used to protect the Radiotrons during shipment. Uncoil and extend the power cord, also the antenna and ground leads. Refer to the tube location diagram on the license label inside the cabinet, and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

Replace the rear panel.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. It should be as short and direct as possible and preferably should be made to a cold-water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the license label.

OPERATION

The instrument has three operating controls, located on the front of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Left-Hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Tone Range Switch* (Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.

(3) *Station Selector* (Right-Hand Knob)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

To operate the receiver, proceed as follows:

1. Turn on the power and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.

2. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

3. For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.

4. Set the Tone Range Switch for the preferred tone quality.

5. When through operating, turn the Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

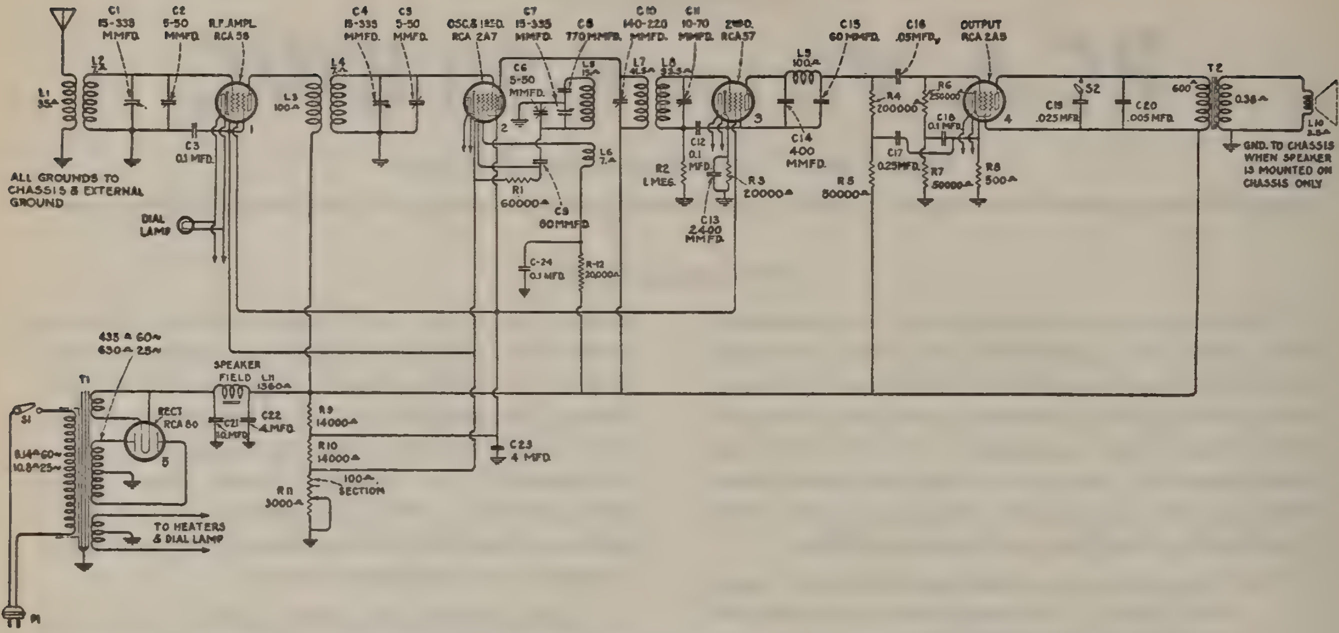

Figure 1—Schematic Circuit Diagram—Note—Sign lamps are connected across R. F. heater

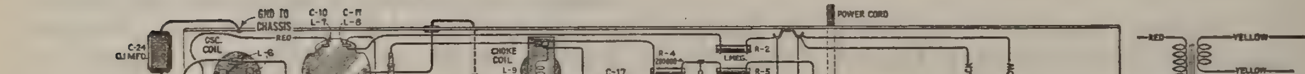

Figure 2—Wiring Diagram—Note—Speaker is not mounted on chassis and sign lamps are connected to R. F. heater

SERVICE DATA

Voltage Rating	115 Volts
Frequency Rating	25–40 Cycles and 50–60 Cycles
Power Consumption	70 Watts
Number and Types of Radiotrons	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker, two-point tone control, single heater type Pentode Output and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

RADIOTRON SOCKET VOLTAGES

115 Volt A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	725 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Contact cap—Package of 5	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5.	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5.	.40
3588	Volume control—Complete with mounting nut	1.40
3589	Switch—Tone control switch	.54
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5.	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
3623	Shield—Antenna or R. F. Coil Shield	.30
3624	Socket—Lamp socket and bracket—Located behind aperture wings	.40
3739	Knob—Station selector or volume control knob—Package of 5	$0.80
3740	Knob—Operating switch knob—Package of 5	.75
3741	Escutcheon—Station selector escutcheon	.30
3742	Screen—Ivory colored screen—Located behind front panel covering aperture "wings"—Package of 2	.54
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
6473	Scale—Dial scale	.50
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7589	Capacitor—Filter capacitor—Two 4. 0 mfd. in container	1.64
7590	Capacitor—10 mfd.	1.40
7592	Condenser—3 gang variable tuning condenser	3.35
8986	Transformer — Power transformer — 200–250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
9025	Transformer—Power transformer—105–125 volts—50–60 cycles	4.26
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9004	Coil assembly—Comprising field coil, magnet and cone support	2.35

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-28-P

Five-Tube Double-Range Superheterodyne

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet. To prevent damage to the cabinet finish and possible internal injury, the instrument should not be placed on a radiator or too close to a source of heat. It must be mounted only in the normal upright position, so as to insure proper ventilation and maximum life of the tubes. Particularly if the cabinet is of the small box or chest type, care should be taken to avoid restriction of natural ventilation as would occur with the set fitted into a small compartment or backed up too close to a wall or other vertical plane surface.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set is therefore ready to operate when it is removed from the carton and external connections are made as heretofore described. The corrugated-paper covers, used to protect the tubes during shipment, should be removed before operating the set.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Refer to the tube location diagram on the rating label and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

NOTE—On closed-back models, it will be necessary to take off the rear cover of the cabinet in order to remove the corrugated-paper tube covers and to inspect the tube installation as outlined above. Because of the small clearance above the tubes on some models, the chassis must be entirely removed from the cabinet in order to test or replace the Radiotrons. To permit withdrawal of the chassis, it is necessary to take off the four knobs on the front panel and remove the four bolts through the bottom of the cabinet. When it is desired to have the tubes tested in one of these models, it is recommended that the complete instrument be taken to a reputable dealer, who will generally be glad to remove and test the Radiotrons without charge except for necessary tube replacements.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Tone Range Switch* (Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.

(3) *Station Selector* (Right-hand Knob—Symmetrical with Volume Control)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) *Frequency Range Switch* (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400–2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:

(a) Police Calls—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118–122" for stations operating in the 2450 kilocycle band.

(b) Amateur Radio "Phone"—At dial settings "90–95" (assigned band 1900–2000 kilocycles).

(c) Aviation Reports, Airport Beacons, etc.—At dial settings "95–118" (assigned band 2000–2400 kilocycles).

(d) Amateur Radio "CW" (Code)—At dial settings "80–90" (assigned band 1715–1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).

2. Turn on the power and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.

3. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

NOTE—The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

4. For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.

5. Set the Tone Range Switch for the preferred tone quality.

6. When through operating, turn the Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

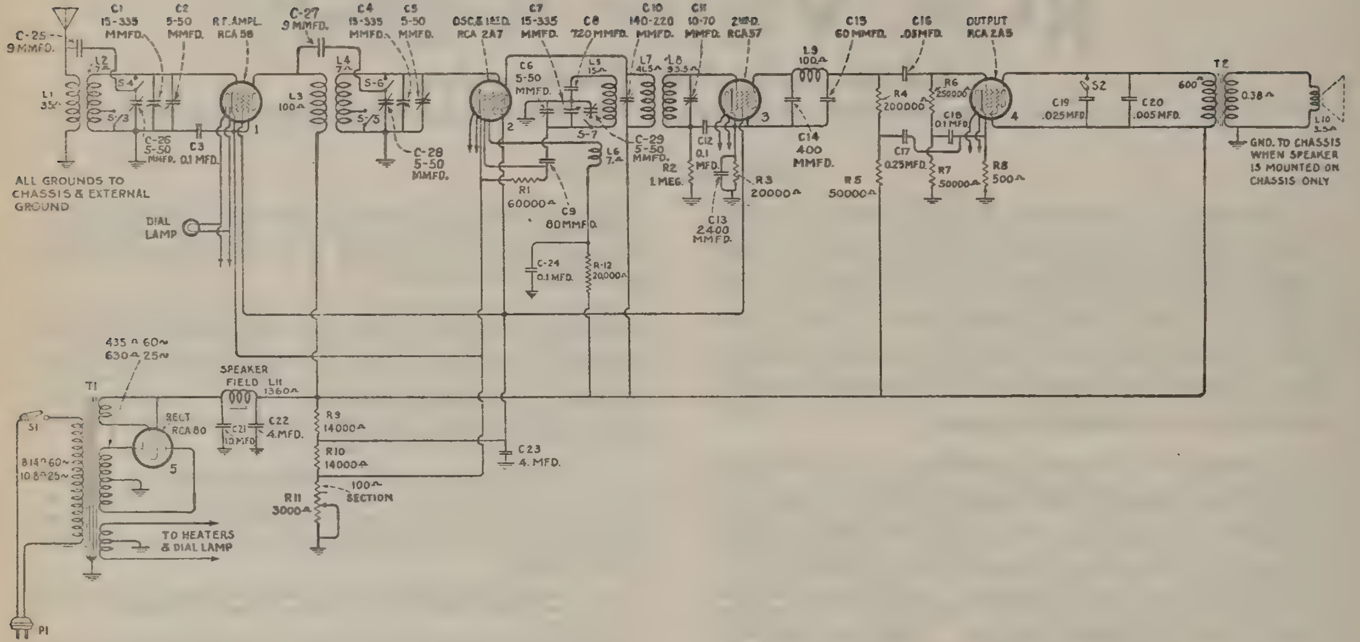

Figure A—Schematic Circuit

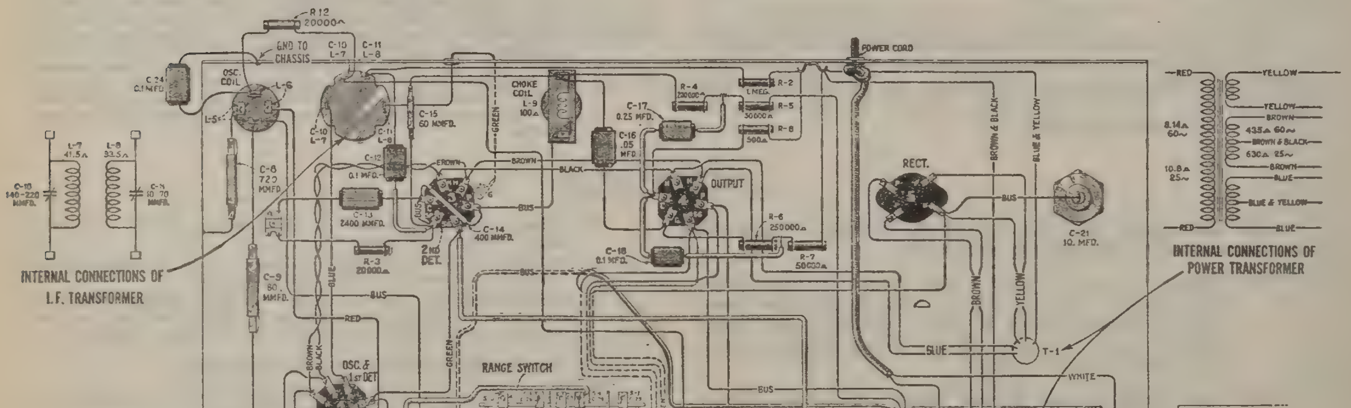

Figure B—Wiring Diagram

SERVICE DATA

Voltage Rating	115 Volts
Frequency Rating	25-40 Cycles and 50-60 Cycles
Power Consumption	70 Watts
Number and Types of Radiotrons	1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This receiver is a five-tube Super-Heterodyne incorporating a Dynamic Loudspeaker as a part of the chassis; two-point tone control; single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	.35
3024	Capacitor—9 mmfd.—Package of 2	.50
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Registor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3574	Coil—Choke coil	.68
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3590	Escutcheon—Station selector escutcheon—Package of 5	1.40
3591	Escutcheon—Name plate escutcheon—Package of 5	1.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5	1.10
3604	Capacitor—400 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one 0.025 mfd. capacitors	.40
3615	Knob—Tone control or range switch knob—Package of 5	$0.60
3623	Shield—Antenna or R. F. Coil shield	.30
3705	Scale—Dial scale assembly	.50
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6471	Coil—Oscillator coil assembly	.74
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil assembly	.94
6529	Switch—Range switch—Long	1.25
6530	Switch—Range switch—Short	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—Three gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10.0 mfd.	1.40
8985	Transformer—Power transformer—105–125 volts—50-60 cycles	4.26
8986	Transformer — Power transformer — 200–250 volts — 60 cycles	4.38
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support	2.35

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

RCA Victor M-34

Automobile Receiver

Superheterodyne

INSTRUCTIONS

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

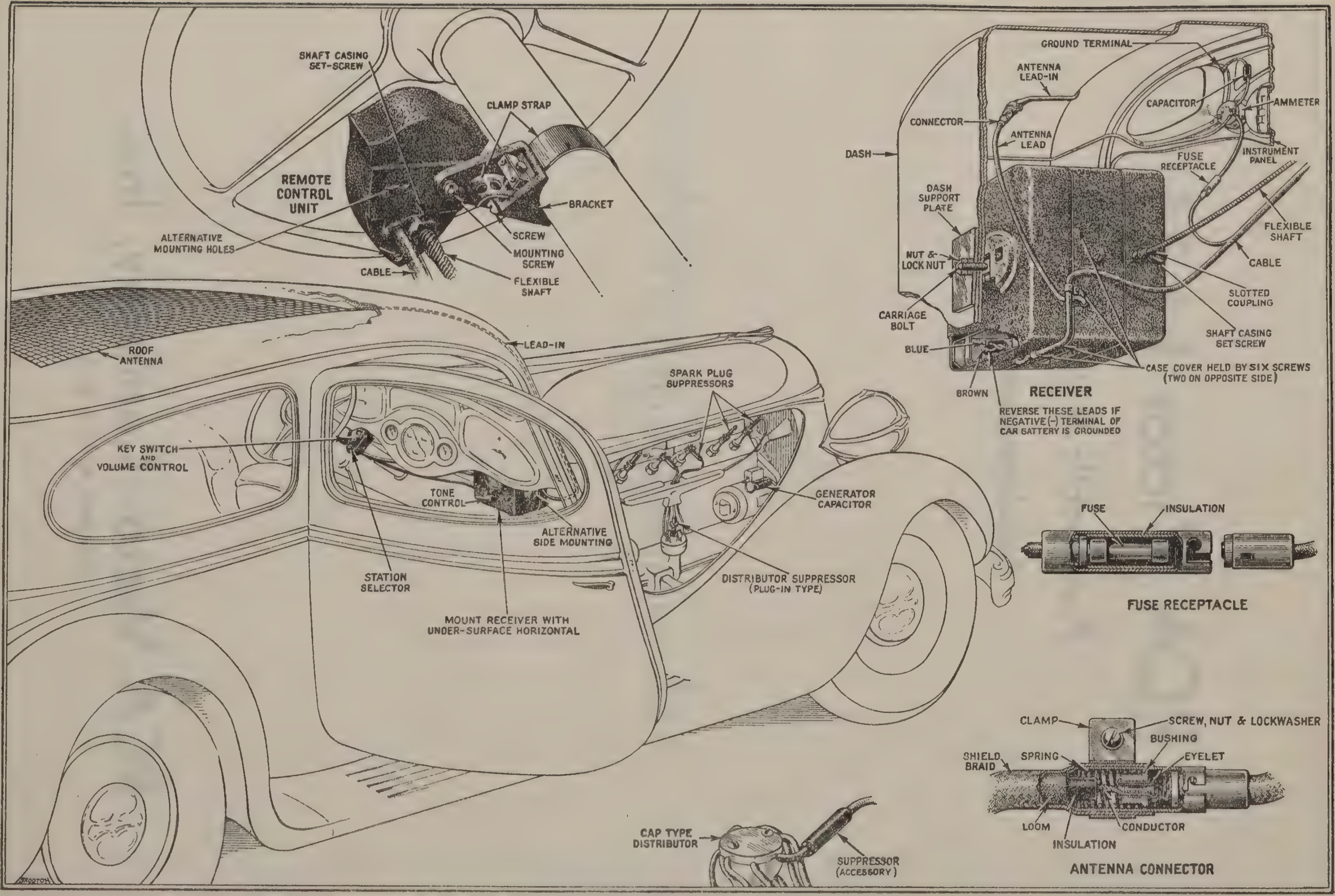
SHAFT CASING SET-SCREW
CLAMP STRAP
REMOTE CONTROL UNIT
BRACKET
ALTERNATIVE MOUNTING HOLES
SCREW
MOUNTING SCREW
CABLE
FLEXIBLE SHAFT
ROOF ANTENNA
LEAD-IN
KEY SWITCH AND VOLUME CONTROL
TONE CONTROL
ALTERNATIVE SIDE MOUNTING
STATION SELECTOR
MOUNT RECEIVER WITH UNDER-SURFACE HORIZONTAL
SPARK PLUG SUPPRESSORS
GENERATOR CAPACITOR
DISTRIBUTOR SUPPRESSOR (PLUG-IN TYPE)
CAP TYPE DISTRIBUTOR
SUPPRESSOR (ACCESSORY)
GROUND TERMINAL
ANTENNA LEAD-IN
CAPACITOR
AMMETER
CONNECTOR
ANTENNA LEAD
DASH
INSTRUMENT PANEL
FUSE RECEPTACLE
DASH SUPPORT PLATE
FLEXIBLE SHAFT
NUT & LOCK NUT
CABLE
SLOTTED COUPLING
CARRIAGE BOLT
SHAFT CASING SET SCREW
BLUE
CASE COVER HELD BY SIX SCREWS (TWO ON OPPOSITE SIDE)
BROWN
RECEIVER
REVERSE THESE LEADS IF NEGATIVE (-) TERMINAL OF CAR BATTERY IS GROUNDED
FUSE
INSULATION
FUSE RECEPTACLE
CLAMP
SCREW, NUT & LOCKWASHER
BUSHING
SHIELD BRAID
SPRING
EYELET
LOOM
CONDUCTOR
INSULATION
ANTENNA CONNECTOR

Figure 1

Instructions for

RCA Victor M-34

Automobile Receiver

INTRODUCTION

Mechanical simplicity and high-quality performance are keynotes of this automobile radio receiver. The instrument consists of a superheterodyne chassis, a loudspeaker, and a vibrator-type "B" battery eliminator mounted in a single case. It is operated from the car storage battery.

A remote control unit, mounted on the steering column and connected to the receiver through a flexible shaft and cable, places all controls convenient to the driver. This unit contains the station selector control, a glare-proof illuminated dial (calibrated in station channels) and a combined volume control and "key-lock" power switch.

Equipment for the suppression of ignition interference is provided. The use of a roof (built-in or interior type) antenna is recommended.

PART I—INSTALLATION

Procedure

1. Unpack the set from carton and check equipment. (See "**Equipment Furnished**"—page 4.)
2. CHECK POLARITY OF AUTOMOBILE STORAGE BATTERY SUPPLY. If the negative (—) side is grounded to car frame, remove case cover and make changes to chassis connections shown in Figure 1. *Do not disturb these connections if positive* (+) *side is grounded.* (See details under "**Mounting of Units**"—page 5.) Replace case cover.
3. Determine most satisfactory mounting position (see details under "**Location of Units**"—page 4), spot mounting-bolt location and drill ½″ diameter hole. Insert bolt through dash and assemble support plate and nuts on engine side. Hang receiver over bolt head and tighten nuts. (See Figure 1 and details under "**Mounting of Units**"—page 5.)
4. Attach remote control unit to steering column by means of mounting bracket and strap. (See Figure 1 and details under "**Mounting of Units**"—page 5.)
5. Assemble flexible shaft to receiver and remote control unit. (See Figure 1 and details under "**Mounting of Units**"—page 6.) *Make sure that the set-screws are tightened firmly against both ends of shaft casing.*
6. Connect metal-shielded lead from receiver to antenna by means of coupling connector. (see notes on antennas under "**Location of Units**"—pages 4 and 5—and details of lead-in under "**Connections**"—pages 6 and 7.)
7. Connect terminal at end of *black* lead from cable to binding-post of automobile ammeter (see Figure 1 and details under "**Connections**"—page 7). The ignition by-pass capacitor (equipped with two leads) should be installed at this time. (See Figure 1 and paragraph 4 under "**Suppression of Ignition Interference**"—page 7.)
8. Install spark-plug and distributor suppressors; also generator by-pass capacitor (see Figure 1 and paragraphs 1, 2 and 3 under "**Suppression of Ignition Interference**"—page 7).
9. Push knob over shaft protruding through front of remote control unit. Observing the dial scale rotate knob slowly—first to stop position slightly beyond "150" and then reverse to other stop position slightly beyond "55."
10. Insert key in lock on remote control unit and turn to extreme clockwise position. Dial should become illuminated immediately but the tubes will not reach proper operating temperature until after approximately 45 seconds. (See details under "**PART II—OPERATION**" and "**PART III—MAINTENANCE.**")

Equipment

A. Equipment Furnished:

1. *Receiver Package*—Includes the receiver and remote control units joined by the wiring cable:

(a) The receiver contains one each of the following Radiotrons installed in sockets: RCA-78, RCA-6A7, RCA-6B7, RCA-89.

(b) The remote control unit contains one dial lamp (6–8 volts).

(c) The wiring cable includes one fuse (20 amperes) installed in attached fuse receptacle.

2. *Outfit Package*—Containing:

(a) Flexible shaft (33⅛ inches long).

(b) Receiver unit mounting bolt ($\frac{7}{16}$ inch diameter), dash support plate, and nuts (2).

(c) Steering column bracket for remote control unit with strap, screws (2) and lockwasher (1).

(d) Shield clamp for antenna lead-in wire with screw (1), lockwasher (1) and nut (1).

(e) Key (1) and knob (1) for remote control unit and eye lets (2) for antenna connector packed in small envelope.

(f) Ignition Interference Suppression Equipment:

6 Spark plug type suppressors (additional obtainable from your dealer).

1 Distributor type suppressor.

2 Capacitors.

(g) Instruction Book.

B. Additional Equipment Required:

1. *Antenna*—One of the following types:

(a) Roof (built-in) type—recommended.

(b) Roof (interior) type for attachment to head-lining inside car—also recommended. A special antenna of this type complete with pin-hooks and lead-in wire may be purchased from your dealer.

(c) Plate (sub-mounted) type for attachment to channe members of car chassis—alternative. An efficient plate antenna completely equipped for mounting and a specially-designed shielded lead-in wire also are obtainable from the dealer.

Location of Units

Receiver and Remote Control Units—The arrangement of units shown in Figure 1 is recommended and will be found applicable to the majority of automobiles. Consideration should be given to the possibility of interference of the receiver with other equipment beneath the instrument panel or of the mounting bolt with apparatus on the engine side of the dash. By placing the receiver unit toward the right-hand side of the dash, the flexible shaft will be of correct length as furnished in practically all cases. This position, however, may be considered impractical because of its universal preference for heating devices, necessitating installation of the receiver unit either near the center or at the extreme left-hand side of the dash and the use of a shorter flexible shaft. In such cases, the shaft may be either shortened (as described under "Mounting of Units") or exchanged for one of proper length by the dealer.

NOTE—Two support brackets are attached to the receiver case, one on the rear surface and the other on the right-hand side viewing the loudspeaker opening. The side bracket must be used when the unit is mounted at the extreme left-hand end of the dash in order to avoid sharp bends in the flexible shaft and resultant unsatisfactory operation.

As furnished, the remote control unit is equipped for attachment to the steering column of the car. Its clamp bracket is so designed that the driver may select from a wide variety of possible mounting positions for maximum accessibility. The associated bracket strap will be found to accommodate practically any diameter steering column. If considered desirable, however, the remote control unit may be supported upon the instrument panel by means of an accessory bracket procurable from the dealer.

Antenna:

(a) *Roof (Built-in) Type*—Best results will be obtained by use of a built-in roof antenna. The majority of modern automobiles (closed body types only) are already equipped with such an antenna installed at the factory, the lead-in wire from which will usually be found coiled up beneath the instrument panel. Many other earlier cars employ a piece of metallic screen—for top material support—which, if ungrounded (not in electrical contact with the metallic frame), may be readily utilized as an antenna.

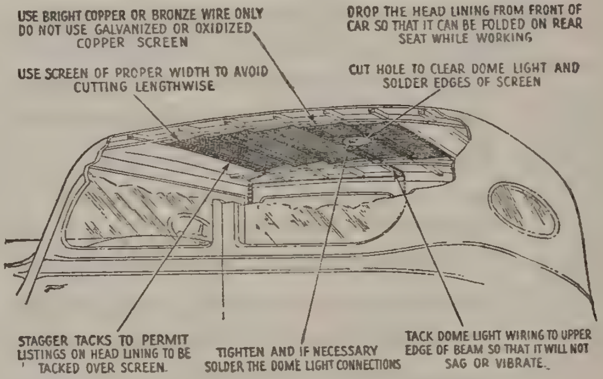
USE BRIGHT COPPER OR BRONZE WIRE ONLY DO NOT USE GALVANIZED OR OXIDIZED COPPER SCREEN
DROP THE HEAD LINING FROM FRONT OF CAR SO THAT IT CAN BE FOLDED ON REAR SEAT WHILE WORKING
USE SCREEN OF PROPER WIDTH TO AVOID CUTTING LENGTHWISE
CUT HOLE TO CLEAR DOME LIGHT AND SOLDER EDGES OF SCREEN
STAGGER TACKS TO PERMIT LISTINGS ON HEAD LINING TO BE TACKED OVER SCREEN.
TIGHTEN AND IF NECESSARY SOLDER THE DOME LIGHT CONNECTIONS
TACK DOME LIGHT WIRING TO UPPER EDGE OF BEAM SO THAT IT WILL NOT SAG OR VIBRATE.

Figure 2

NOTE—The presence of a top support screen and of grounds in that screen may be determined without removing any portion of the inside fabric (head-lining). First procure any sharp-pointed metallic tool, push the point through the fabric (at several points if necessary) and feel around in an attempt to scrape the screen surface—being careful not to punctuate the weather-proof top. If a screen is found, connect an ordinary dash or head-lamp between either terminal of the automobile ammeter and the tool, re-insert the tool through the head-lining and make contact with the screen. If the lamp lights, however dimly, it shall be assumed that the screen is grounded.

In order to use an ungrounded support screen, first release the head-lining at the front corner nearest the receiver. Then connect a flexible rubber-insulated lead to the corner of the screen and solder the joint. Feed the free end of the lead down the adjacent pillar-post of the car into the driving compartment and replace the head-lining.

If the top support screen is grounded, or if no screen is present, it will be necessary to drop the entire head-lining (see Figure 2). In the former case, the screen may be insulated by removal of a strip several inches from all edges and from the dome light fixture. The possibility of subsequent shifting may be eliminated by tacking the screen to one or more of the ribs and by lacing the sides with cord. Where no support screen is used, a copper screen having a total area of at least ten square feet should be inserted. It should be located as far to the rear as possible and insulated from all metallic parts grounded to the frame of the car. The antenna finally should be tested for grounds (see the foregoing "NOTE" for test procedure). If satisfactory, attach the lead-in wire and replace the head-lining of the car.

> NOTE—Since a degree of skill—only acquired by experience—is necessary in removing and replacing the top fabric material, such work should be allotted to a competent "trim" man.

(b) *Roof* (*Interior*) *Type*—The accessory interior-type roof antenna also will provide very satisfactory performance and, in addition, is extremely simple to install. It may be quickly attached to the head-lining inside the car (preferably as far to the rear as possible) by means of pin-hooks, thereby precluding removal of the fabric. An antenna of this type, however, should not be used in any automobile having *a grounded* top material support screen since the proximity of that screen would seriously reduce its efficiency. Before purchase, therefore, it will be advisable to check this possibility, following the test procedure described under "*Roof* (*Built-in*) *Type.*"

As furnished, the interior-type antenna is equipped with a sufficient length of lead-in wire ready-attached. The effective antenna wire is enclosed by long-wearing paper procurable either in "gray" or "tan" finish as desired to harmonize with the car upholstery.

(c) *Plate Type*—For those cases where the installation of a built-in roof antenna is considered too costly and the interior roof antenna impractical, good reception from local or semi-distant powerful stations may be procured with the special plate-type antenna also obtainable as an accessory. This unit should be clamped to the frame of the chassis as far to the rear as possible. It is adjustable in length and may be mounted either lengthwise or crosswise of the chassis, which position should be selected with due regard to the prevention of overcrowding. The plate must be placed as close to the ground as possible, but not below the lowest portion of the chassis at the desired location, as sufficient road clearance must be retained. It is also important to avoid any position in which the plate will impede free motion of chassis parts such as springs, drive shaft, or axles in order to prevent damage to the antenna.

Mounting of Units

Details of mounting the various units are shown in Figure 1. The following procedures are recommended:

Receiver Unit—It is necessary first to determine the electrical polarity of the storage battery supply. This may be done most conveniently by making an examination of the battery connections and ascertaining which terminal is grounded (that is, connected to the frame of the car). The positive terminal is usually marked (+) and tends to form corrosion far more rapidly than the negative (—). If the positive terminal is grounded, no change in the electrical connections of the receiver unit will be required. However, if the opposite is true, the cover of the receiver unit case (held in place by six screws) must be removed and the two leads (equipped with spade terminals) located beneath the radio chassis as shown in Figure 1 must be reversed.

Now replace the case cover and support the assembled unit against the dash in the chosen location. Allowing a clearance of at least two inches above the top surface, where possible, to permit subsequent removal of the case from the mounting bolt head, mark with a pencil or crayon on the dash four points corresponding to the corners of the adjacent case surface. Then determine the exact center of the area bounded by those four points (by drawing diagonal lines between opposite corners) and mark that position with a center-punch. Next drill a ½ inch hole at the center-punch mark and insert the mounting bolt. The support plate and the two nuts then should be assembled upon the bolt from the engine side of the dash as shown but should not be tightened. Finally hang the receiver over the bolt head, align sides vertically and tighten the nuts in place.

Remote Control Unit—In attaching the remote control unit to the steering column of the car, it will be advisable first to examine the detailed view (in Figure 1) showing the assembly of its mounting bracket. Four small holes are contained in the associated flexible strap at distances proper for use with steering columns of the most common diameters (1½, 1⅝, 1¾, 1⅞ inches), but the strap length will be found sufficient to permit the insertion of an additional hole if necessary to accommodate a 2 inch column. The proper hole may be determined by wrapping the clamp strap tightly around the column, inserting the machine screw furnished through that hole found to be nearest in alignment with the tapped hole in the clamp bracket. Three tapped holes are provided in the back of the remote control unit, permitting support of that unit either at the right- or left-hand side or above the steering column.

Flexible Shaft—Insert that end of the flexible shaft to which is attached the slotted coupling through the bushed opening in the left side of the receiver unit. Then rotate the shaft from the free end until the coupling slot is felt to engage over the pin contained in the tuning mechanism and slide the shaft forward to the full depth of the slot. With the shaft held in this position, insert the opposite end of the shaft through the bushing at the rear of the remote control unit and push forward until the flatted portion of the shaft protrudes through the front cover. Then proceed to tighten the external set-screw (located at the bottom of the case—see Figure 3) adjusting the shaft position as necessary until the screw is felt to engage in the groove. Tighten the screw fully to the bottom of the slot and then loosen it approximately one-quarter of a turn. Finally, secure the flexible casing in place by tightening the set-screws at each end *firmly*, so as to provide good electrical contact as well as solid mechanical support.

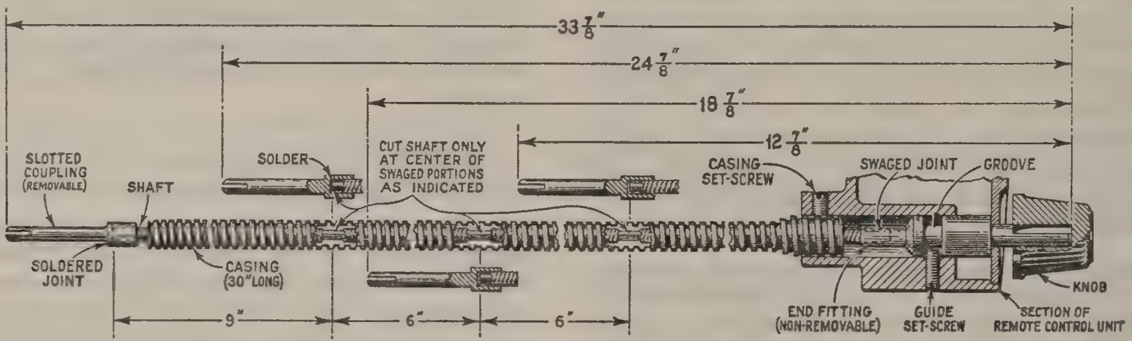
33 7/8"
24 7/8"
18 7/8"
12 7/8"
SLOTTED COUPLING (REMOVABLE)
SHAFT
SOLDER
CUT SHAFT ONLY AT CENTER OF SWAGED PORTIONS AS INDICATED
CASING SET-SCREW
SWAGED JOINT
GROOVE
SOLDERED JOINT
CASING (30" LONG)
KNOB
END FITTING (NON-REMOVABLE)
GUIDE SET-SCREW
SECTION OF REMOTE CONTROL UNIT
9"
6"
6"

Figure 3

NOTE—In many installations it will be found necessary or desirable to use a flexible shaft of shorter length than 33⅞ inches. While it is simplest to procure a shaft of proper length from the dealer as mentioned heretofore, very little difficulty should be experienced in shortening the original part if deemed expedient. To shorten the shaft, refer to Figure 3 and proceed as follows:

1. Determine the minimum shaft length permissible for the installation.
2. Remove the slotted coupling (using a soldering iron) and withdraw the shaft from its casing.
3. Cut the shaft only at the center of a swaged joint, selecting that joint which allows at least the required length.
4. Cut from the shaft casing a length equal to the amount of shaft removed. (This operation may be simplified by placing the casing between wooden blocks in a vise so that the block ends will serve to guide the hack saw blade.)
5. Replace the shaft in its casing and solder the slotted coupling to the end of the shaft.

Connections

Refer to Figure 1 and make connections as follows:

Antenna to Receiver—For least ignition interference, any portion of the antenna lead-in wire which extends behind the instrument panel or into the engine compartment of the car should be fully shielded and cut to eliminate excessive slack when attached to the receiver antenna connector. Before connecting the antenna to the receiver, the following comments applying to the particular type of antenna adopted should be observed:

(a) *Roof Antenna* (Built-in Type)—The lead-in wire from a factory-installed built-in roof antenna usually is unshielded and often is of insufficient length to reach the receiver. If necessary, an extra length of insulated wire may be spliced to the existing lead-in, in which case the joint must be soldered and wrapped with tape. In general, it will be advisable to shield the exposed length of lead-in wire, procuring for this purpose from your dealer a length of shield braid and an equivalent length of insulating loom (or rubber tubing) sufficient to extend between the end of the lead-in wire and its point of entrance from the body pillar post. Slip the loom over the lead-in wire and the shield braid over the loom.

(b) *Roof Antenna* (*Interior Type*)—If an interior type antenna is used, the lead-in wire should be brought down the outside of that front pillar post nearest the receiver.

(c) *Plate Type Antenna*—With the plate type antenna, the full-shielded end of the special cable should be brought into the automobile driving compartment through a ½ inch hole drilled in the toe-board (if no other opening is available). This end is to be connected to the receiver unit antenna lead (as explained in following paragraphs) and the opposite (unshielded) end then cut off as required to eliminate excessive slack upon connection to the plate. The pigtail extension from the end of the shield must be soldered or bonded to the frame of the car.

Refer to the detailed view of the antenna connector shown in Figure 1 and proceed to attach the lead-in wire (if shielded) as follows: First, cut the end of the lead-in so that the internal insulated wire and loom (if present) are flush with the end of the shield covering and push back the shield approximately 1½ inches. Cut the loom to the end of the shield and then remove sufficient insulation to expose one inch of clean bare-conductor. Now disconnect the female portion of the connector attached to the receiver antenna lead and remove the small internal bushing and spring.

To assemble, slip the bared conductor through the female portion of the connector and then through the spring and bushing, making certain that the insulation enters the end of the connector. Bend over and spread the strands of the conductor against the forward end of the bushing and then force one of the eyelets (packed in small envelope in outfit package) into the bushing to hold the conductor in position. Cut off the ends of the conductor strands approximately ⅛ inch beyond the edge of the eyelet and bend the strands over toward the center of the eyelet. The assembly may be now attached to the receiver portion of the connector and the shield covering on the lead-in wire pushed forward to cover the adjacent end of the female portion. Finally, bond the shield to the connector by means of the small clamp furnished. **No soldering operations are required.**

> NOTE—An unshielded lead-in wire (as in the case of the interior-type antenna) may be attached to the antenna connector as described above except that all references to the shield braid and loom may be neglected.

Power Supply to Receiver—The power input lead (*black* wire with fuse receptacle and terminal, extending from the receiver cable) must be connected electrically to the ungrounded side of the car storage battery. This connection preferably may be made at the battery terminal of the ammeter (usually the terminal with only one lead attached—consult wiring diagram in instruction book for automobile) and any slack length remaining should be taped securely behind the instrument panel.

Suppression of Ignition Interference

1. Disconnect all wires from the spark plugs. Fasten one spark plug suppressor to the top of each plug and re-attach the wires to the free ends of the suppressors. These suppressors may be mounted either in line with or at right angles to the plugs (as shown in Figure 1) in order to avoid interference with metallic parts grounded to the engine or frame.

2. If the distributor is of the plug-in type, disconnect the center wire from the head. Plug the distributor suppressor into the distributor head and insert the wire in the free end of the suppressor.

> NOTE—For cap-type distributors, exchange the distributor suppressor at your dealer's for one of a special type. Cut the wire leading from the distributor to the coil and screw the suppressor into the end attached to the distributor. Screw the other end of the wire (leading to the coil) into the opposite end of the suppressor.

3. Clamp the generator by-pass capacitor against the generator frame. The screw holding the cut-out ordinarily may be utilized for securing this unit. Connect the capacitor lead to the terminal on the generator side of the cut-out switch. (In some cases, interference will be reduced by connecting the capacitor lead to the opposite side of the cut-out. The most suitable position for this lead must be determined by trial.)

4. The other by-pass capacitor must be connected between the battery terminal of the ammeter and any convenient screw on the instrument panel. In certain cases, interference will be reduced still further by connecting an additional capacitor (obtainable from your dealer) between the battery side of the ignition coil and the car frame.

PART II—OPERATION

The instrument should be operated as follows:

1. Insert the key in the lock on the remote control unit and turn it clockwise to the extremity of its rotation.

> NOTE—This key serves to operate both the power switch and the volume control. A slight rotation clockwise will turn the power "on" and the remainder of the range permits adjustment of volume. The dial scale should become illuminated when the power is "on."

2. Rotate the Station Selector knob in either direction until a desirable station program is heard.

> NOTE—The dial scale is calibrated in channels to aid in station identification. Add one cipher to the scale marking to obtain the actual frequency in kilocycles.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now, readjust the Station Selector to the position midway between the points where the quality becomes poor or the signal disappears. **This operation insures the best quality of reproduction.**

4. Finally, advance the Volume Control (clockwise) until the desired level is obtained. Except on weak signals, the automatic volume control will maintain the volume substantially at the latter level, thereby precluding further manual adjustments. (Fading of the signal may be experienced in extreme cases, as when passing under bridges or other metallic structures, since such structures almost completely shield the antenna.)

5. Set the Tone Range Switch (located on the front of the receiver unit) for the preferred tone quality. This switch has two positions. In the counter-clockwise position, high-frequency (treble) response and static interference (when present) are decreased.

6. When through operating, turn the key to the "off" position, counter-clockwise. The instrument is then locked by removing the key.

PART III—MAINTENANCE

Noisy or weak reception, or failure to operate, may be due to one of the following causes:

Radiotrons—If the set fails to operate (particularly when first installed), remove the case cover and make certain that all Radiotrons are in the proper sockets and that the control grid clips are pressed down firmly over the respective dome terminals as shown by the diagram printed on the label affixed to the inside of the cover.

The Radiotrons should be tested periodically and replaced if necessary in order to maintain best performance. The efficiency of each Radiotron may be checked by comparison with a new one of the same type in its place. Spare Radiotrons of each type should be kept on hand.

Fuses—This installation is protected by one fuse (rated 20 amperes) which is mounted in the fuse receptacle contained in the power input lead. If the set fails to operate and the dial lamp does not light, this fuse should be removed for examination. If found to be burned out, the wiring should be inspected for short-circuits or grounds and all tubes tested prior to insertion of a new fuse. **The replacement fuse must be of the same ampere rating.**

"B" Battery Eliminator—With the key switch turned to the "on" position, a slight buzz should be noticed to emanate from the receiver. This buzz should be taken as indicative of proper operation of the "B" Battery Eliminator vibrator. Failure to observe this buzz, accompanied by repeated necessary replacement of the fuse, will denote a faulty condition, and, in such cases, the complete receiver should be taken to the dealer for inspection. **Do not attempt to adjust the vibrator yourself!**

Antenna—A properly installed roof antenna of the built-in or interior-type should require no attention. When the plate antenna is employed, the insulator bushings should be cleaned occasionally to prevent grounding.

Ignition System—The ignition system of the car must be kept in good condition. Fouled plugs or plugs with improperly adjusted gaps will affect the operation of the receiver as well as of the automobile. Burned or improperly adjusted breaker points will also impair the performance. It will be advisable to advance the generator charging rate in order to compensate for the additional drain on the car storage battery imposed by this instrument.

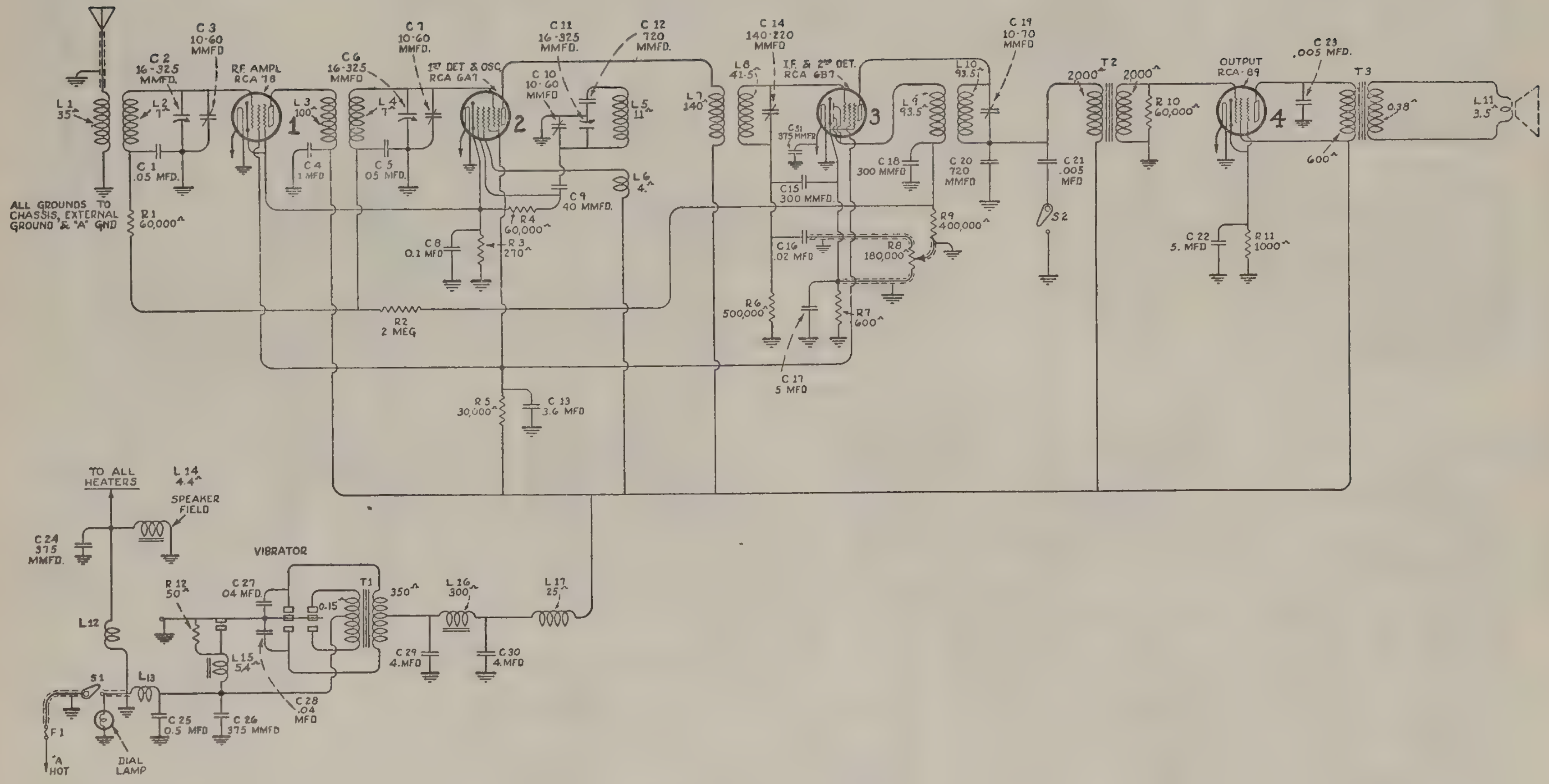

Figure A—Schematic Circuit

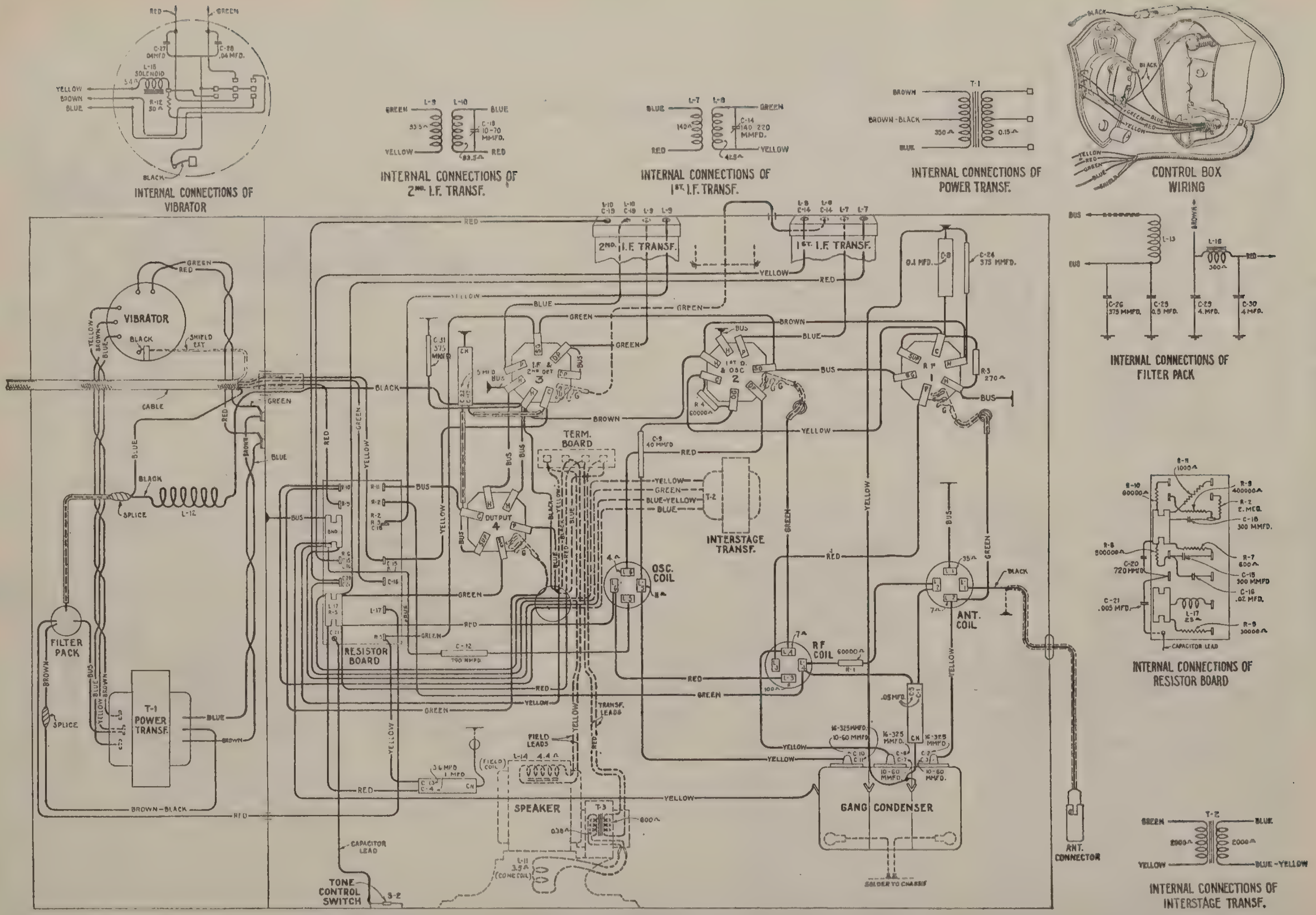

Figure B—Wiring Diagram

PART IV—SERVICE DATA

Type and Number of Radiotrons Used	1 RCA-89, 1 RCA-78, 1 RCA-6A7, 1 RCA-6B7—Total, 4
Total Battery Current	5.5 Amperes
Undistorted Output	2.0 Watts
Loudspeaker Field Current	1.35 Amperes
Maximum Output D. C. Voltage from Rectifier	250 Volts
Total Plate Current	53 M. A.

This four tube Superheterodyne Automobile Receiver is of compact construction and gives excellent performance. Features such as unit construction (one unit contains the receiver, plate supply unit and loudspeaker), ease of installation, freedom from ignition noise and excellent sensitivity, selectivity and tone quality characterize this instrument.

Plate Supply Unit

This receiver uses a vibrator type Inverter and rectifier that provides a source of direct current voltage for use as plate and grid supply for all Radiotrons. *This unit is accurately adjusted at the factory and service adjustments should not be attempted.* Any difficulties with this unit should be referred to the nearest Distributor handling these instruments who has instructions for servicing this item.

Line-up Capacitor Adjustments

The three R. F. line-up capacitors and two I. F. tuning capacitors are accessible and may require adjustments. The R. F. adjustments are made at 1400 K. C. and the I. F. adjustments at 175 K. C. The R. F. adjustments can be made with the receiver in its case, access to the adjusting screws being obtained through a slot in the bottom of the case. For the I. F. adjustments, however, it is necessary to remove the rear cover in order to couple the oscillator to the first detector. The following procedure should be used for either adjustments:

R. F. Adjustment

The three R. F. line-up capacitors are adjusted at 1400 K. C. Proceed as follows:

(a) A fairly accurate adjustment can be made by using the ear for an indicating device, thus eliminating the need of an output meter and the necessity of removing the rear cover to connect it.

(b) Procure a modulated oscillator giving a signal at 1400 K. C. and a non-metallic screw driver.

(c) Couple the output of the oscillator from antenna to ground, set the dial at 140, and the oscillator at 1400 K. C.

(d) Place the oscillator and receiver in operation and adjust the oscillator output so that a weak signal is obtained in the loudspeaker when the volume control is at its maximum position.

(e) Then adjust the three line-up capacitors until maximum sound in the speaker is obtained. Readjust these capacitors a second time as there is a slight interlocking of adjustments.

For a more accurate adjustment, the use of an output meter is recommended. However, this will require the removal of the rear cover in order to connect the output meter across the cone coil. Also the bottom and Radiotron side of the chassis must be shielded together with the transformer so that vibrator noise will not be obtained, due to the removal of the case shielding.

I. F. Adjustments

In order to make the I. F. adjustments, it is necessary to remove the rear cover, due to the fact that the external oscillator must be connected between the control grid of the first detector and ground. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver and an output meter.

(b) Remove the receiver from its case, shield the transformer and Radiotrons as described under R. F. adjustments, place the receiver in operation and connect the oscillator output between the first detector grid and ground. Connect the output meter across the voice coil of the loudspeaker. Then connect the antenna lead to ground and adjust the tuning capacitor so that no signal except the I. F. oscillator is heard at maximum volume. With the volume control at maximum, reduce the external oscillator output until a small deflection is obtained. Unless this is done, the action of the A. V. C. will make it impossible to obtain correct adjustments.

(c) Each transformer has but one winding that is tuned by means of an adjustable capacitor, the other windings being untuned. The capacitors should be adjusted for maximum output.

At the time I. F. adjustments are made it is good practice to follow this adjustment with the R. F. adjustments, due to the interlocking that always occurs. The reverse of this, however, is not always true.

Practical Hints on Installation

The following suggestions may prove useful when making installations on the particular cars mentioned.

Chevrolet 1933—Mount chassis on left side, end against car bulkhead and use short flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors. Place a copper screen under the toe board on right side, 10″ x 10″, to prevent the body from radiating ignition interference which may be picked up by the antenna. This screen must be grounded.

Plymouth 1933—Mount chassis on left side, back against car bulkhead and use 33⅞″ flexible shaft. Use both capacitors, one on the ammeter and one on the generator. Use all suppressors.

Ford V-8 1932—Mount chassis on left side, end against car frame and use short flexible shaft. Use one capacitor, connected to the generator. Install eight spark plug type suppressors only, no distributor suppressor being necessary.

The majority of cars will be found to be entirely free from ignition noise when the standard equipment is used. Usually mounting the chassis on the right side of the bulkhead will be found most desirable, although if a heater is used, the left side will be preferable.

RADIOTRON SOCKET VOLTAGES

6.3 Volt Battery

Radiotron No.		Cathode to Ground	Cathode to Screen Grid Volts	Cathode to Plate Volts	Plate Current M. A.	Heater Volts
RCA-78 R. F.		3.7	92	253	7.0	6.06
RCA-6A7	First Detector	3.7	92	253	12.0 Total	6.06
	Oscillator	0	—	253		
RCA-6B7 Second Detector		3.2	92	236	6.0	6.06
RCA-89 Power		26.5	230	217	27.5	6.06

SERVICE DATA FOR VIBRATOR UNIT

The vibrator unit used in this receiver is of excellent design and sturdy construction. It functions as a combined A. C. generator and mechanical rectifier. Referring to Figure C, it will be noted that the primary and secondary of the transformer are center tapped. By connecting the outside of each winding to the contacts of the vibrator and using the arms and center taps of the windings as sources of input and output voltage, a combined generating and rectifying action is obtained.

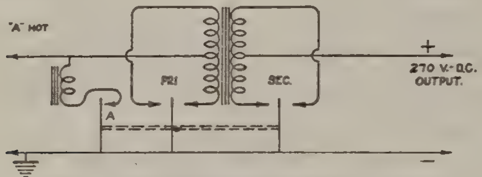

Figure C—Schematic of Vibrator Unit

When the switch is turned "on" the vibrator makes and breaks contact at point "A." This constitutes the driving action of the unit, and is in no way connected with the other circuits. The primary vibrator functions to connect the input low voltage current first across one-half and then across the other half of the primary of the transformer. This results in a pulsating direct current applied to the primary in an alternating direction. The result is an A. C. voltage emanating from the secondary of the transformer. Due to the transformer having a step-up ratio the A. C. secondary voltage is considerably greater than the primary. The secondary vibrator functions in a similar manner as that on the primary side, so that by reversing the alternations applied to the load, a pulsating D. C. is obtained. After filtering, this is used as plate and grid supply to all Radiotrons.

(1) Spring and Contact Adjustment Limits.

Proper adjustments of the various contacts are made in the following order and manner:

1. With 8 and 10, Figure D, firmly held against their respective stops and with 3 and 5 in contact with 8 and 10 respectively, the air gap between 1, 6 and 2, 7 shall be 0.015" plus or minus 0.005". On no particular unit however, shall the differences between the two air gaps exceed 0.005".

2. Adjust the buzzer screw, 11, Figure D, so that when the position of the armature is such that 1 and 2 are just making contact with 6 and 7 respectively, the contact between 4 and 9 shall just be breaking.

(2) Adjustment for the Reduction of Sparking.

If any pair of contacts show excessive sparking, the following procedure will in general reduce the sparking to a minimum.

For example, consider the case where excessive sparking is occurring between 6 and 1. Sparking will be reduced to a minimum by bending the armature spring on that side (secondary side) away from 6 and toward 8. (See Figure D.) If the bend is too small, only a small change will be noted. However, if an excessive bend is made, the sparking will be transferred from 6, 1 to 8, 3.

The same method may be applied to any pair of contacts. Usually only a slight bend will be necessary. Although after bending, no change in the position of the armature contacts may be noted, a sufficient change in the initial force requirements will have been made to reduce sparking.

(3) Output Voltage.

When connected to a 6 volt primary source, the output voltage across a 5,000 ohm resistor (connected in place of the receiver load at the output of the filter), must be 240 volts or greater. The output voltage on receivers should be at least 225 volts.

(4) Failure to Start.

Failure of the vibrator to start may be due to any of the following:

1. Low battery voltage. This may be due to either a low voltage battery or high resistance connections. The connection should be made to the battery side of the ammeter, otherwise the resistance of the ammeter may be sufficient to reduce the voltage at the vibrator to a degree that it will fail to start. If any doubt exists, measure the voltage between the "A" hot connection of the ammeter and ground with the set turned "on."

2. Improper adjustment of the buzzer screw. Unless the buzzer screw is adjusted so that the center contact breaks just as the outer contacts make when being pushed toward the coil, failure to start or sticking may occur. See (1) par. 2.

3. Improper tension of center contact spring. If there is any indication of improper tension of the center contact spring, such as small or irregular amplitude of armature vibration, it should be removed and flattened so that it is entirely straight before being replaced. If the vibrator initially operated properly and then failed, a slight bow should be placed in the center contact spring in the direction of the contact.

(5) Vibrator R. F. Interference.

Two bronze contacts are provided between the case and chassis for proper grounding of the chassis, thereby preventing R. F. interference from the vibrator. One of these contacts is fastened to one of the screws holding the I. F. transformer and the other is held between the edge of the chassis and the case near the vibrator. Whenever the chassis is removed, these contacts should be checked to be sure they are in position and that proper tension exists to maintain a good contact.

Make sure that all grounds and connections in the receiver and filter pack are O. K. before adjusting the vibrator for R. F. interference. Unless it is due to excessive sparking, an adjustment will reduce the interference only for a short time.

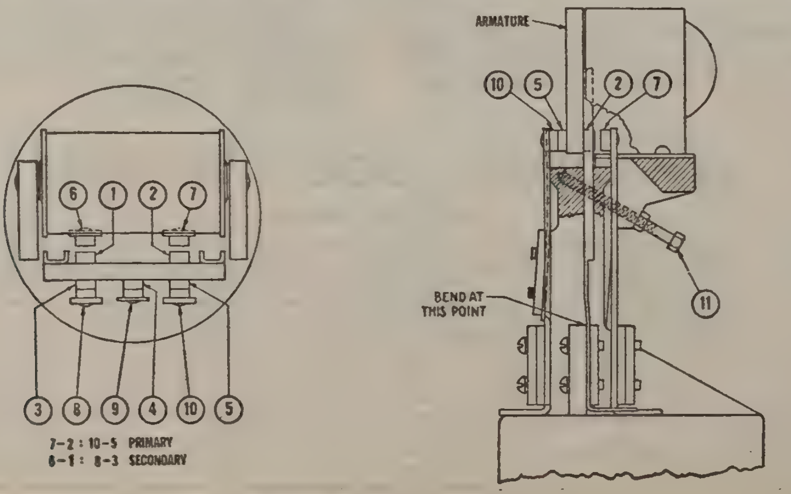

Figure D—Vibrator Contacts

Check All Adjustments on Vibrators Requiring Adjustments of Any Kind

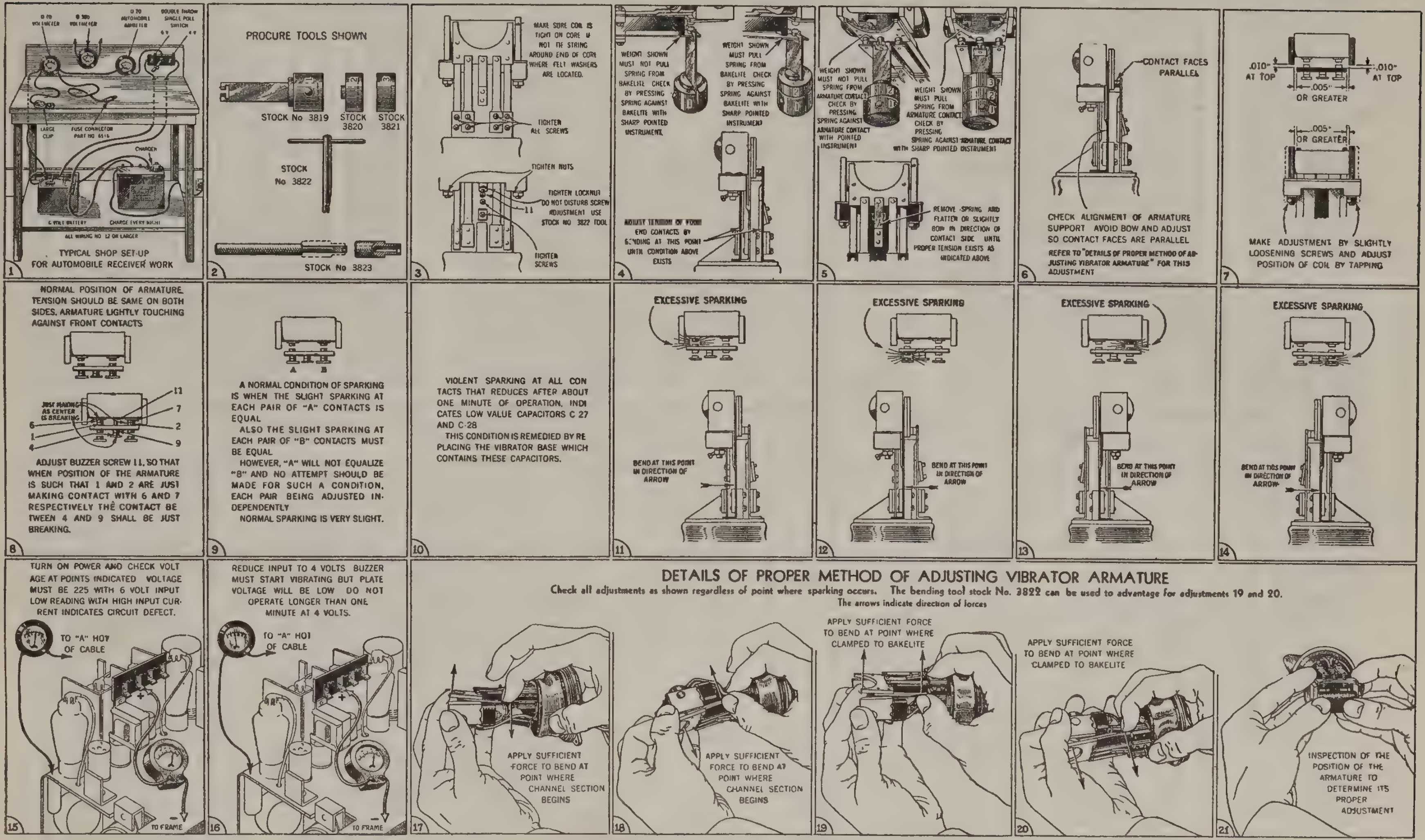
0 10 VOLTMETER
0 300 VOLTMETER
0 20 AUTOMOBILE AMMETER
DOUBLE THROW SINGLE POLE SWITCH
6 V
6 V
LARGE CLIP
FUSE CONNECTOR PART NO 6516
CHARGER
6 VOLT BATTERY
CHARGE EVERY NIGHT
ALL WIRING NO 12 OR LARGER
TYPICAL SHOP SET-UP FOR AUTOMOBILE RECEIVER WORK
1
PROCURE TOOLS SHOWN
STOCK No 3819
STOCK 3820
STOCK 3821
STOCK No 3822
STOCK No 3823
2
MAKE SURE COIL IS TIGHT ON CORE IF NOT TIE STRING AROUND END OF CORE WHERE FELT WASHERS ARE LOCATED.
TIGHTEN ALL SCREWS
TIGHTEN NUTS
TIGHTEN LOCKNUT DO NOT DISTURB SCREW ADJUSTMENT USE STOCK NO 3822 TOOL
11
TIGHTEN SCREWS
3
WEIGHT SHOWN MUST NOT PULL SPRING FROM BAKELITE CHECK BY PRESSING SPRING AGAINST BAKELITE WITH SHARP POINTED INSTRUMENT
WEIGHT SHOWN MUST PULL SPRING FROM BAKELITE CHECK BY PRESSING SPRING AGAINST BAKELITE WITH SHARP POINTED INSTRUMENT
ADJUST TENSION OF FOUR END CONTACTS BY BENDING AT THIS POINT UNTIL CONDITION ABOVE EXISTS
4
WEIGHT SHOWN MUST NOT PULL SPRING FROM ARMATURE CONTACT CHECK BY PRESSING SPRING AGAINST ARMATURE CONTACT WITH POINTED INSTRUMENT
WEIGHT SHOWN MUST PULL SPRING FROM ARMATURE CONTACT CHECK BY PRESSING SPRING AGAINST ARMATURE CONTACT WITH SHARP POINTED INSTRUMENT
REMOVE SPRING AND FLATTEN OR SLIGHTLY BOW IN DIRECTION OF CONTACT SIDE UNTIL PROPER TENSION EXISTS AS INDICATED ABOVE
5
CONTACT FACES PARALLEL
CHECK ALIGNMENT OF ARMATURE SUPPORT AVOID BOW AND ADJUST SO CONTACT FACES ARE PARALLEL
REFER TO "DETAILS OF PROPER METHOD OF ADJUSTING VIBRATOR ARMATURE" FOR THIS ADJUSTMENT
6
.010" AT TOP
.010" AT TOP
.005" OR GREATER
.005" OR GREATER
MAKE ADJUSTMENT BY SLIGHTLY LOOSENING SCREWS AND ADJUST POSITION OF COIL BY TAPPING
7
NORMAL POSITION OF ARMATURE. TENSION SHOULD BE SAME ON BOTH SIDES, ARMATURE LIGHTLY TOUCHING AGAINST FRONT CONTACTS
JUST MAKING AS CENTER IS BREAKING
11
7
2
9
6
1
4
ADJUST BUZZER SCREW 11, SO THAT WHEN POSITION OF THE ARMATURE IS SUCH THAT 1 AND 2 ARE JUST MAKING CONTACT WITH 6 AND 7 RESPECTIVELY THE CONTACT BETWEEN 4 AND 9 SHALL BE JUST BREAKING.
8
A
B
A NORMAL CONDITION OF SPARKING IS WHEN THE SLIGHT SPARKING AT EACH PAIR OF "A" CONTACTS IS EQUAL
ALSO THE SLIGHT SPARKING AT EACH PAIR OF "B" CONTACTS MUST BE EQUAL
HOWEVER, "A" WILL NOT EQUALIZE "B" AND NO ATTEMPT SHOULD BE MADE FOR SUCH A CONDITION, EACH PAIR BEING ADJUSTED INDEPENDENTLY
NORMAL SPARKING IS VERY SLIGHT.
9
VIOLENT SPARKING AT ALL CONTACTS THAT REDUCES AFTER ABOUT ONE MINUTE OF OPERATION, INDICATES LOW VALUE CAPACITORS C 27 AND C 28
THIS CONDITION IS REMEDIED BY REPLACING THE VIBRATOR BASE WHICH CONTAINS THESE CAPACITORS.
10
EXCESSIVE SPARKING
BEND AT THIS POINT IN DIRECTION OF ARROW
11
EXCESSIVE SPARKING
BEND AT THIS POINT IN DIRECTION OF ARROW
12
EXCESSIVE SPARKING
BEND AT THIS POINT IN DIRECTION OF ARROW
13
EXCESSIVE SPARKING
BEND AT THIS POINT IN DIRECTION OF ARROW
14
TURN ON POWER AND CHECK VOLTAGE AT POINTS INDICATED VOLTAGE MUST BE 225 WITH 6 VOLT INPUT LOW READING WITH HIGH INPUT CURRENT INDICATES CIRCUIT DEFECT.
TO "A" HOT OF CABLE
+
−
TO FRAME
15
REDUCE INPUT TO 4 VOLTS BUZZER MUST START VIBRATING BUT PLATE VOLTAGE WILL BE LOW DO NOT OPERATE LONGER THAN ONE MINUTE AT 4 VOLTS.
TO "A" HOT OF CABLE
+
−
TO FRAME
16
DETAILS OF PROPER METHOD OF ADJUSTING VIBRATOR ARMATURE
Check all adjustments as shown regardless of point where sparking occurs. The bending tool stock No. 3822 can be used to advantage for adjustments 19 and 20.
The arrows indicate direction of forces
APPLY SUFFICIENT FORCE TO BEND AT POINT WHERE CHANNEL SECTION BEGINS
17
APPLY SUFFICIENT FORCE TO BEND AT POINT WHERE CHANNEL SECTION BEGINS
18
APPLY SUFFICIENT FORCE TO BEND AT POINT WHERE CLAMPED TO BAKELITE
19
APPLY SUFFICIENT FORCE TO BEND AT POINT WHERE CLAMPED TO BAKELITE
20
INSPECTION OF THE POSITION OF THE ARMATURE TO DETERMINE ITS PROPER ADJUSTMENT
21

Figure E—Vibrator Adjustments

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor—30,000 ohms—Carbon type—1 watt (R5)	$0.22
3218	Resistor—600 ohms—Carbon type—¼ watt (R7)—Package of 5	1.00
3572	Socket—Radiotron 7-contact socket	.38
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1, R4, R10)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C15, C18)	.34
3617	Capacitor—0.005 mfd. (C21)	.38
3618	Capacitor—0.02 mfd. (C16)	.38
3619	Resistor—400,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3621	Coil—Choke coil—Located on resistor board (L17)	.35
3636	Transformer—First intermediate frequency transformer (L7, L8, C14)	1.74
3637	Transformer—Second intermediate frequency transformer (L9, L10, C19)	1.65
3641	Capacitor—0.1 mfd. (C8)	.35
3644	Bracket—Condenser drive bracket and roller	.40
3645	Knob—Tone control knob—Package of 5	.90
3695	Capacitor—375 mmfd. (C24, C31)	.22
3696	Capacitor—40 mmfd. (C9)	.22
3738	Resistor—1,000 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3745	Capacitor—745 mmfd.	.34
3746	Capacitor—800 mmfd.	.34
3769	Resistor—750 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3790	Mounting screws, washer, and bushing assembly—For 3-gang variable tuning condenser — Comprising three spacers, three screws, three washers, and three lockwashers.	.18
3851	Capacitor—790 mmfd. (C12)	.34
6135	Resistor—270 ohms—Carbon type—¼ watt (R3)—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt (R6)—Package of 5	1.00
6192	Spring—Tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohms—Carbon type—¼ watt (R2)—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6488	Transformer—Interstage audio transformer (T2)	1.30
6489	Coil—Antenna coil (L1, L2)	.86
6490	Tone control switch	.35
6492	Capacitor—Comprising one 3.6 mfd. and one 1.0 mfd. capacitors (C4, C13)	1.08
6493	Drum—Tuning condenser drive drum	.40
6513	Capacitor—Comprising two 5.0 mfd. capacitors (C17, C22).	1.00
6514	Capacitor—Comprising two 0.05 mfd. capacitors (C1, C5)	.28
6515	Cable—Shielded cable with antenna connector	.32
6516	Connector—Fuse connector	.16
6517	Cable—Main cable complete with fuse connector	1.40
6540	Coil—R. F. coil assembly (L3, L4)	.94
7485	Socket—Radiotron 6-contact socket	.40
7600	Filter pack—Comprising one reactor, one choke coil, one 0.5 mfd., two 4.0 mfd. and one 375 mmfd. capacitors (L13, L16, C25, C26, C29, C30)	4.06
7601	Condenser—3-gang variable tuning condenser	2.84
9430	Transformer—Power transformer (T1)	3.60
	CONTROL BOX ASSEMBLIES	
3649	Key—Volume control and switch key	.18
3650	Screw—Self locking No. 10–32–3/16″ fulldog point set screw—Package of 10	.32
3651	Screw—Self locking No. 10–32–3/16″ cupped point set screw—Package of 10	.32
3652	Screw—Self locking No. 10–32–¼″ cupped point set screw—For flexible drive shaft—Package of 10	.32
3690	Strap and bracket assembly—Comprising one bracket, two screws, one lockwasher and one strap	.40
3718	Bracket—Control box dash mounting bracket	.25
3757	Coupling—Slotted coupling for end of flexible drive shaft—Package of 5	.40
3758	Connector—For control box end of flexible drive shaft—Package of 5	$0.68
6161	Knob—Station selector knob—Package of 5	.90
6496	Shaft—Flexible drive shaft complete with connectors—Approximately 24⅞″ long	1.60
6497	Shaft—Flexible drive shaft complete with connectors—Standard length—Approximately 33⅞″ long	1.75
6499	Volume control—Combination volume control and switch (R8)	1.36
6500	Nut—Volume control and switch lock nut	.24
6501	Scale—Dial scale	.40
6531	Shaft—Flexible drive shaft complete with connectors—Approximately 12⅞″ long	.85
6532	Shaft—Flexible drive shaft—Complete with connectors—Approximately 18⅞″ long	1.24
7602	Box—Control box complete	3.00
7603	Cover—Control box cover	.44
	MISCELLANEOUS PARTS	
3466	Connector—Antenna lead-in connector	.60
3646	Fuse—20 amperes—Package of 5	.40
3647	Nut—Cap nut and lock washer—Package of 10	.35
3648	Screw—No. 10–32–3/16″ cap screw and lockwasher—Package of 10	.32
3689	Bracket—Receiver mounting bracket, bolt and nut assembly—One set	.30
3791	Bushing and plate assembly—Flexible drive shaft bushing with plate, mounting screws, rubber bushings, and washers—Located on main case	.30
3827	Cable—From fuse connector to ammeter	.10
3843	Cement—4-oz. bottle—For fastening stock No. 3801	.25
3856	Clip—Spring clip—Grounds receiver chassis to metal housing—Package of 10	.30
3884	Clamp—Cable clamp—Package of 10	.20
6151	Suppressor—Spark plug suppressor	.56
6152	Suppressor—Distributor suppressor	.56
6175	Suppressor—Distributor splice-in suppressor	.56
6494	Capacitor—Ammeter capacitor—0.5 mfd.	.46
6495	Capacitor—Generator capacitor—0.5 mfd.	.72
6617	Lacquer—Touch-up lacquer (one pint of lacquer and one pint of thinner)	2.25
6670	Suppressor—Spark plug suppressor—"Elbow type"	.56
7621	Antenna—Roof antenna—Paper type (Brown)	1.50
7622	Antenna—Roof antenna—Paper type (Gray)	1.50
7645	Housing—Rear section of housing complete with mounting screws	1.66
7646	Housing—Front section of housing complete with mounting screws	2.30
	VIBRATOR ASSEMBLIES	
3611	Spring—Buzzer spring and contact point—Package of 5	.60
3612	Screw—Buzzer adjustment screw and nut—Package of 10	.48
3613	Spring—Main contact spring and contact point—Package of 4	.62
3614	Resistor—50 ohms—Carbon type—½ watt (R12)—Package of 5	1.00
3801	Cushion—Rubber damper cushion for vibrator base—Package of 2	.25
6478	Armature assembly—Comprising armature, contacts and springs—Assembled	.86
6479	Coil—Vibrator coil assembly (L15)	1.20
6481	Shield—Outer shield for vibrator assembly	.32
6482	Shield—Inner shield for vibrator assembly	.40
6577	Capacitor and base assembly—Comprising vibrator base and two 0.04 mfd. capacitors (C27, C28)	.78
6765	Support—Bakelite support	.70
7604	Vibrator—Vibrator assembly complete	5.64
	REPRODUCER ASSEMBLIES	
3688	Transformer—Output transformer (T3)	1.50
7607	Screen—Metal screen	.44
7608	Coil assembly—Comprising field coil, magnet and cone support (L14)	2.40
9023	Cone—Reproducer cone complete (L11)—Package of 5	5.00

.0589

Instructions for

RCA Victor Models R-37 and R-38

Six-Tube Superheterodyne Receivers

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

> NOTE—For the 2B7 Radiotron *only,* the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrica outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

OPERATION

The instrument has three operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (Left-hand Knob)—Equipped with illuminated dial—volume increases with clockwise rotation.

(2) *Power Switch and Tone Control* (Middle Knob)—In extreme counter-clockwise position power is "off"—slight clockwise rotation turns on the power. Extreme clockwise position gives full range reproduction—counter-clockwise rotation decreases high frequency (treble) response and reduces static interference.

(3) *Station Selector* (Right-hand Knob)—Equipped with an illuminated dial, graduated in kilocycles (last cypher omitted) to facilitate location and identification of stations.

To operate the receiver, proceed as follows:

1. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Set the Volume Control near "Medium."

2. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard. If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

4. Adjust the Volume Control to the desired volume level.

> NOTE—The *automatic volume control* maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

5. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

6. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

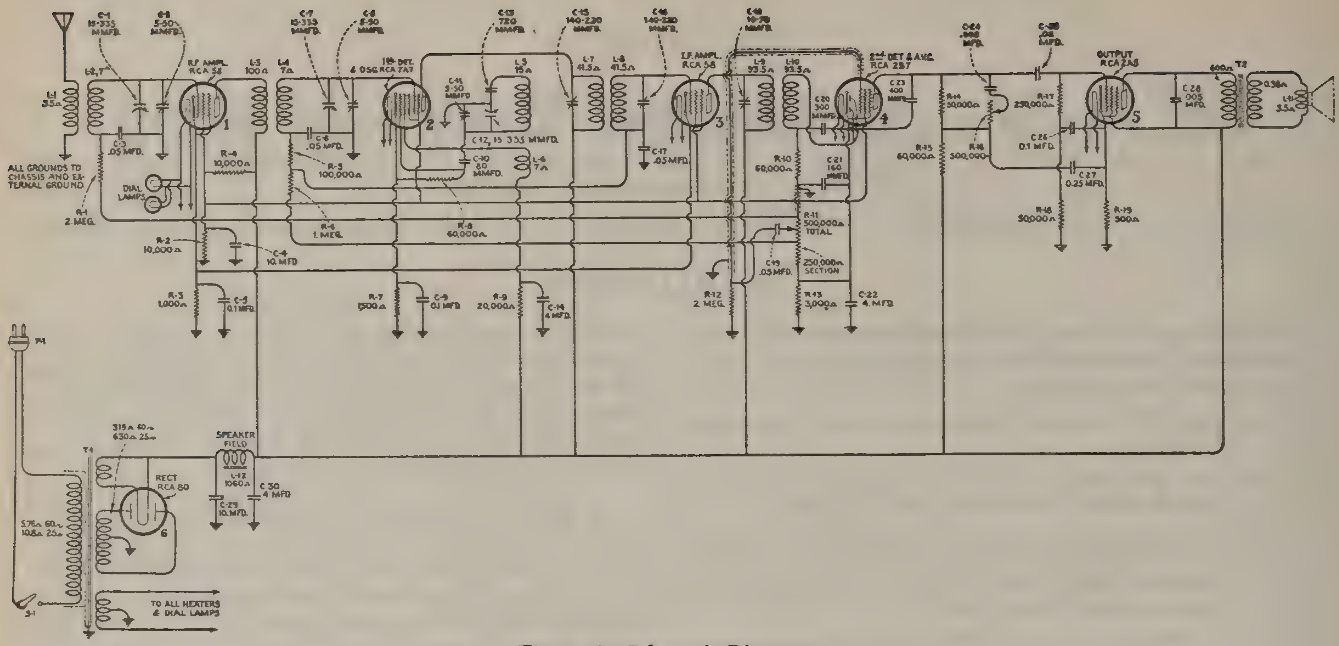

Figure A—Schematic Diagram

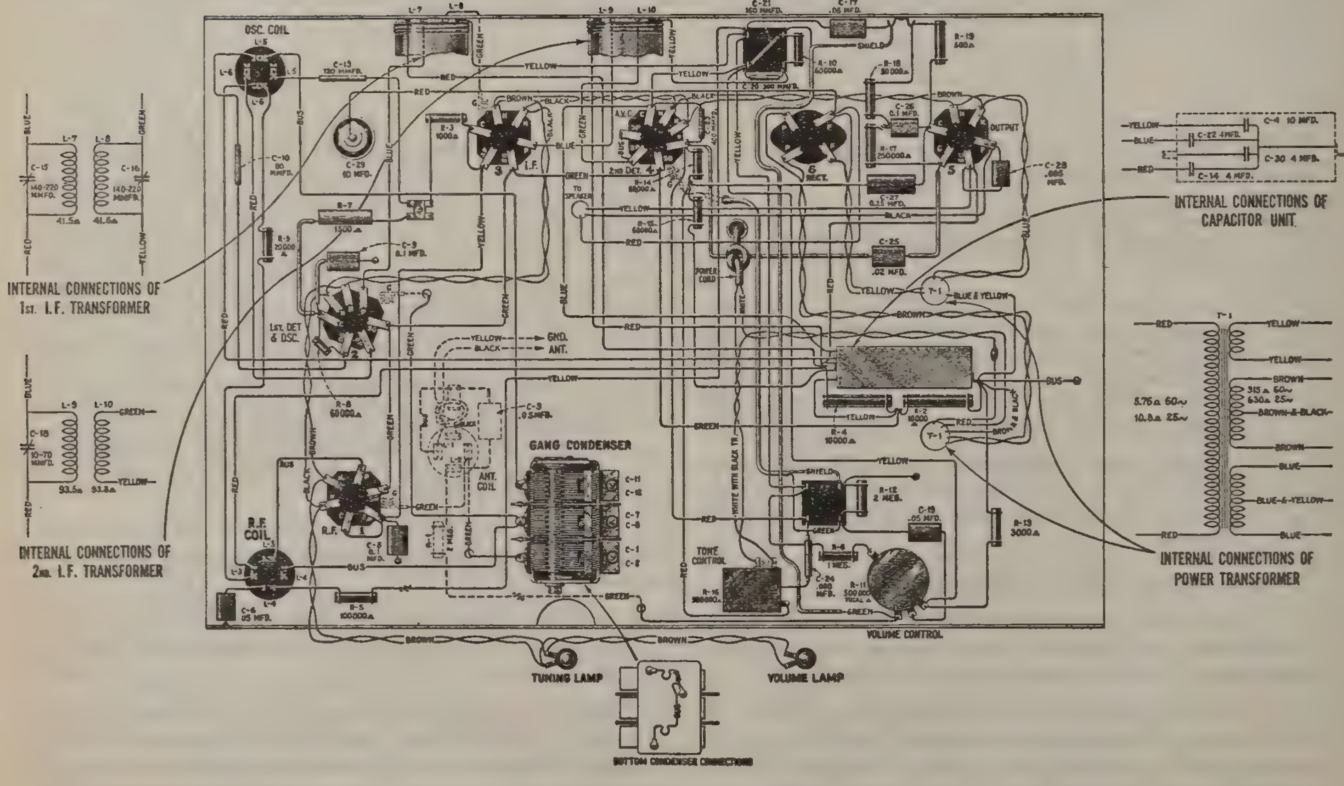

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	115 Volts
Frequency Rating	25–60 and 50–60 Cycles
Power Consumption	60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons	2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C.

This receiver is a six tube Superheterodyne incorporating a Dynamic Loudspeaker as a part of the chassis, automatic volume control, single heater type Pentode output tube, continuosly variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

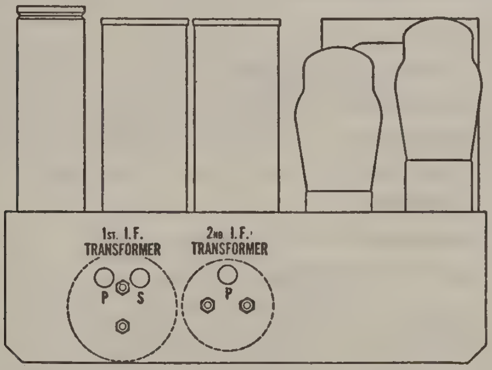

Figure C—Location of I. F. Line-up Adjustment Screws

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the top of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F.	3.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	3.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	3.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rect.	700/350 Volts - 75 M.A. Total Current				4.82

*The Voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2816	Resistor — 1,000 ohms — Carbon type — ½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd.	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3597	Capacitor—0.25 mfd.	.40
3615	Knob—Tone control knob—Package of 5	.60
3616	Capacitor—300 mmfd.	.34
3622	Shield—Radiotron shield—1 used	.36
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3625	Indicator—Volume control indicator	.40
3626	Shield—Oscillator coil shield	.22
3627	Knob—Station selector or volume control knob—Package of 5	.75
3630	Resistor — 10,000 ohms — Carbon type — 3 watts	.25
3632	Resistor — 500 ohms — Carbon type — 1 watt—Package of 5	1.10
3633	Capacitor—400 mmfd.	.38
3634	Capacitor—160 mmfd.	.34
3639	Capacitor—0.02 mfd.	.25
3640	Capacitor—0.05 mfd.	$0.25
3641	Capacitor—0.1 mfd.	.35
3642	Capacitor—0.008 mfd.	.25
3643	Capacitor—0.005 mfd.	.25
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil	.74
6472	Coil—R. F. coil	.94
6473	Scale—Dial scale assembly	.50
6483	Transformer—1st intermediate frequency transformer	1.84
6484	Transformer—2nd intermediate frequency transformer	1.70
6485	Volume control—With mounting nut	1.20
6486	Tone control with mounting nut	1.10
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors	2.90
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron shield—3 used	.25
7590	Capacitor—10.0 mfd.	1.40
7597	Condenser—3 gang variable tuning condenser.	2.85
9005	Transformer—Power transformer—105–125 volts, 50–60 cycles	4.80
9006	Transformer—Power transformer—200–250 volts, 50–60 cycles	5.05
9024	Transformer—Power transformer—105–125 volts, 25–50 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer	1.44
9032	Coil assembly—Comprising coil, magnet and cone support	2.35
9428	Cone—Reproducer cone—Package of 5	5.00

.0578

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23189

Printed in U. S. A.

Instructions for

RCA Victor Models R-37-P and R-38-P

Double-Range Six-Tube Superheterodyne Receivers

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly.
(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.
(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the 2B7 Radiotron *only*, the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (Left-hand Knob)—Equipped with illuminated dial—volume increases with clockwise rotation.

(2) *Power Switch and Tone Control* (Middle Knob)—In extreme counter-clockwise position power is "off"—slight clockwise rotation turns on the power. Extreme clockwise position gives full range reproduction—counter-clockwise rotation decreases high frequency (treble) response and reduces static interference.

(3) *Station Selector* (Right-hand Knob—Symmetrical with Volume Control)—Equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) *Frequency Range Switch* (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540-1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400-2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:

(a) Police Calls—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118-122" for stations operating in the 2450 kilocycle band.
(b) Amateur Radio "Phone"—At dial settings "90-95" (assigned band 1900-2000 kilocycles).
(c) Aviation Reports, Airport Beacons, Etc.—At dial settings "95-118" (assigned band 2000-2400 kilocycles).
(d) Amateur Radio "CW" (Code)—At dial settings "80-90" (assigned band 1715-1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).

2. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Set the Volume Control near "Medium."

3. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard. If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

NOTE—The majority of stations in the 1400-2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540-1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400-2800 kilocycles.

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

5. Adjust the Volume Control to the desired volume level.

NOTE—The *automatic volume control* maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

6. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

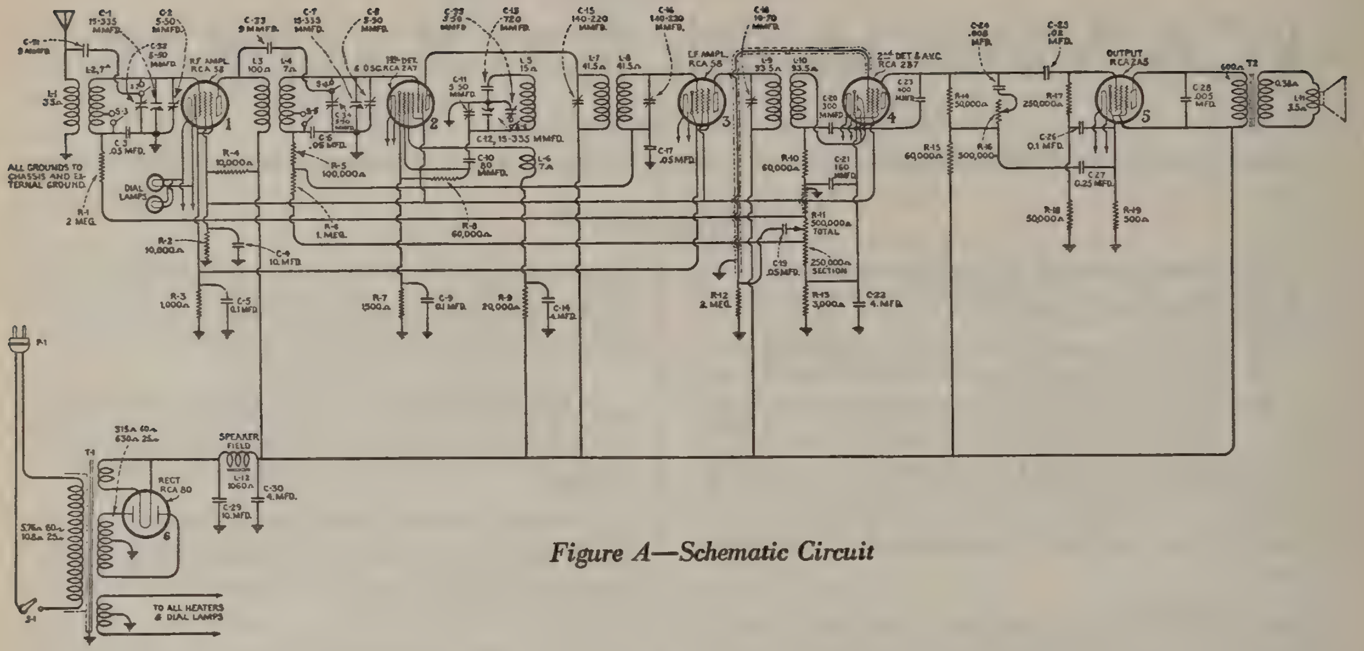

Figure A—Schematic Circuit

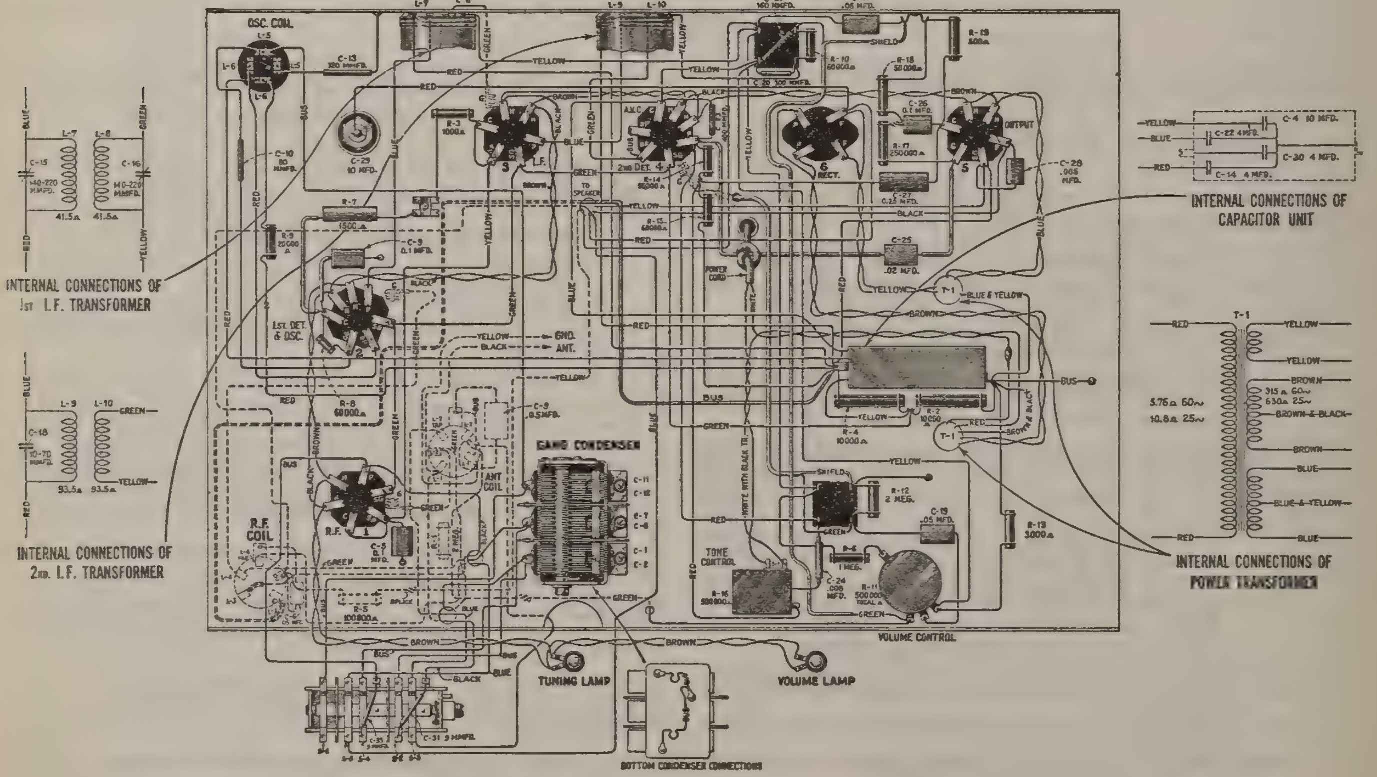

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating.................................115 Volts
Frequency Rating.................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons...............2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output............................1.75 Watts
Frequency Range..................540 K. C. to 1500 K. C.
and 1400 to 2800 K. C.

This receiver is a six tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

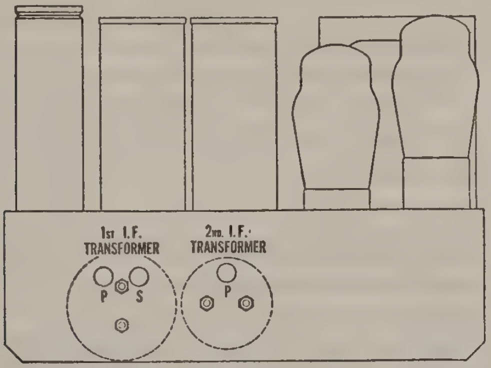

Figure C—Location of I. F. Line-up Adjustment Screws

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F.	3.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	3.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	3.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.31
6. RCA-80 Rectifier	700/350 Volts—75 M. A. Total Current				4.82

*The Voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Cap—Contact Cap—Package of 5	.50
3024	Capacitor—9.0 mmfd.—Package of 2	.50
3047	Resistor—1500 ohms—carbon type—½ Watt Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt —Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd.	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3584	Ring—R. F. or oscillator coil retaining ring —Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd—R. F. and I. F. by-pass	.36
3615	Knob—Tone control or range switch knob—Package of 5	.60
3616	Capacitor—300 mmfd.	.34
3622	Shield—Radiotron shield—1 used	.36
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3625	Indicator—Volume control indicator	.40
3626	Shield—Oscillator coil shield	.22
3627	Knob—Station selector or volume control knob—Package of 5	.75
3628	Escutcheon—Volume control escutcheon	.42
3629	Escutcheon—Station selector escutcheon	.42
3630	Resistor — 10,000 ohms — Carbon type — 3 watts	.25
3632	Resistor — 500 ohms — Carbon type — 1 watt—Package of 5	1.10
3633	Capacitor—400 mmfd.	.38
3634	Capacitor—160 mmfd.	.34
3639	Capacitor—0.02 mfd.	$0.25
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3642	Capacitor—0.008 mfd.	.25
3643	Capacitor—0.005 mfd.	.25
3705	Scale—Dial scale assembly	.50
3721	Resistor — 1,000 ohms — Carbon type — ½ watt—Package of 5	1.00
6188	Resistor—2 megohm—Carbon type—½ watt —Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6471	Coil—Oscillator coil	.74
6483	Transformer—1st intermediate frequency transformer	1.84
6484	Transformer—2nd intermediate frequency transformer	1.70
6485	Volume control—With mounting nut	1.20
6486	Tone control with mounting nut	1.10
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors	2.90
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil	.94
6534	Switch—Range switch	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron shield—3 used	.25
7590	Capacitor—10.0 mfd.	1.40
7597	Condenser—3 gang variable tuning condenser	2.85
9005	Transformer—Power transformer—105-125 volts, 50-60 cycles	4.80
9006	Transformer—Power transformer—200-250 volts, 50-60 cycles	5.05
9024	Transformer—Power transformer—105-125 volts, 25-50 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer	1.44
9032	Coil assembly—Comprising coil, magnet and cone support	2.35
9428	Cone—Reproducer cone—Package of 5	5.00

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RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor RE-40

Radio-Phonograph Combination

Five-Tube Table Model

INSTALLATION

Location—The instrument should be placed on a level surface, such as a table, convenient to the antenna and ground connections and to an electrical outlet.

Phonograph—Remove the packing material from the phonograph compartment. With the speed shifter (lever projecting beneath turntable at front left-hand corner) set in the outward (78 R. P. M.) position, mount the turntable (packed in outfit package) on the motor spindle. Make sure that the drive pin engages the slot in the turntable hub. Insert the used-needle cup (also in outfit package) in the opening provided.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label inside the cabinet.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set is therefore ready to operate when it is removed from the carton and external connections are made as described in the foregoing. The corrugated paper cover, used to protect the tubes during shipment, should be removed before operating the set.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Refer to the tube location diagram on the rating label and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

NOTE—In order to remove the Radiotrons for test or replacement it is necessary to take out the four motorboard screws at the corners of the turntable compartment and raise the motorboard to provide the necessary clearance above the tubes.

OPERATION

The instrument has four operating controls located on the right-hand side panel of the cabinet, as follows:

(1) *Radio Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Record Volume Control* (*Combined with Radio-Record Switch*) (Upper Middle Knob)—For radio operation, this control must be set in the extreme counter-clockwise position. A slight clockwise rotation transfers the switch for phonograph operation—further rotation increases the volume on records.

(3) *Tone Range Switch* (Lower Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.

(4) *Station Selector* (Right-hand Knob)—This control is equipped with an illuminated dial, graduated in kilocycles to facilitate location and identification of stations.

RADIO OPERATION

To operate the receiver, proceed as follows:

1. Set the radio-record transfer switch for "Radio" by turning the Record Volume Control to the extreme counter-clockwise position.

2. Turn on the power and set the Radio Volume Control fully clockwise for maximum volume.

3. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

4. For best reproduction reduce the Radio Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Radio Volume Control—never the Station Selector—for regulation of volume.

5. Set the Tone Range Switch for the preferred tone quality.

6. When through operating, turn the Radio Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

PHONOGRAPH OPERATION

Electric phonograph facilities are provided in this instrument for playing either standard (78 R. P. M.) records or long playing (33⅓ R. P. M.) records. The pickup mechanism is designed to use *Chromium Needles for Long Playing Records* (identified by the orange shank) for the reproduction of either long playing or standard records. These needles with care should play 25 records. *Never re-insert a used Chromium needle after once removing from the pickup.*

Standard (78 R. P. M.) Records—Proceed as follows:

1. Turn the Record Volume Control clockwise from the "Radio" position. Set this control near the middle of its range.

2. Apply power by turning the Radio Volume Control knob slightly clockwise from the "off" position, until the "on" click of the power switch is heard and the dial is illuminated. Several seconds will be required for the Radiotrons to heat before reproduction is possible.

3. Place a standard (78 R. P. M.) record on the turntable. Loosen the needle screw on the electric pickup. Insert a Chromium needle (either orange or green shank), or a full volume (full tone) steel or Tungstone needle, as far as it will go and tighten the needle screw. (Do not play more than one record with each *steel* needle.)

4. Pull the starting lever (right-hand side of turntable) forward to start the turntable. Set the speed shifter (left-hand side of turntable) outward for 78 R. P. M. Then place the needle on the smooth outer surface of the record and slide it into the first groove.

5. Adjust the Record Volume Control to obtain the desired volume.

6. The Tone Range Switch should normally be set in the counter-clockwise position, in which position most faithful reproduction over the entire musical range is obtained. To reduce needle scratch noise, particularly on old type records, this switch may be changed to the clockwise position.

7. When the record has been played, lift the pickup and move it to the right so as to clear the turntable, thereby stopping the motor. (When through playing an eccentric groove record the motor will stop automatically.)

8. When through operating, switch off the power by turning the Radio Volume Control knob to the extreme counter-clockwise position. The pickup should never be left with the needle resting on the record (or turntable) when not operating the phonograph.

Long Playing (33⅓ R. P. M.) Records—Repeat the procedure outlined under "Standard (78 R. P. M.) Records," with the following exceptions:

(1) Use only *Chromium Needles for Long Playing Records* (identified by the orange shank).

(2) Set the speed shifter inward for 33⅓ R. P. M. This should be done while the turntable is rotating.

Lubrication—The motor should be lubricated with light oil once every six months. Two oil holes on top of the motor are accessible when the turntable is removed. The ball bearing mechanism under the turntable should be lubricated once a year by prying off the cover and packing with vaseline or light motor grease, being careful to prevent any dirt particles from entering with the grease. Make sure that the speed shifter is in the outward (78 R. P. M.) position before replacing the turntable on the spindle.

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating..............25, 30, 40, 50 and 60 Cycles
Power Consumption..................60 Cycles, 95 Watts
Number and Types of Radiotrons...............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output..........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, two-point tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard RCA Victor two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer only, using two tuned circuits, a second detector, an output tube and a rectifier.

Service work in conjunction with this receiver will be similar to that of other Super-Heterodyne receivers of the small compact type construction. The line-up adjustments are made in conjunction with an external oscillator and an output meter. The line-up capacitors on the gang capacitor are adjusted for maximum output when the oscillator is coupled to the antenna and the set and oscillator are both set at 1400 K. C. The I. F. frequency is 175 K. C. and the two circuits that comprise it are adjusted for maximum output at 175 K. C.

Service data for the magnetic pickup is included below.

RADIOTRON SOCKET VOLTAGES

115 Volt, A. C. Line

MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

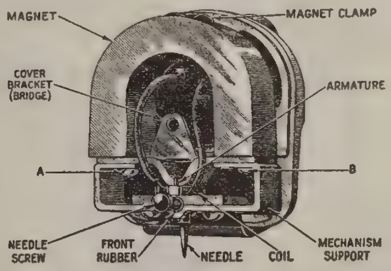

Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

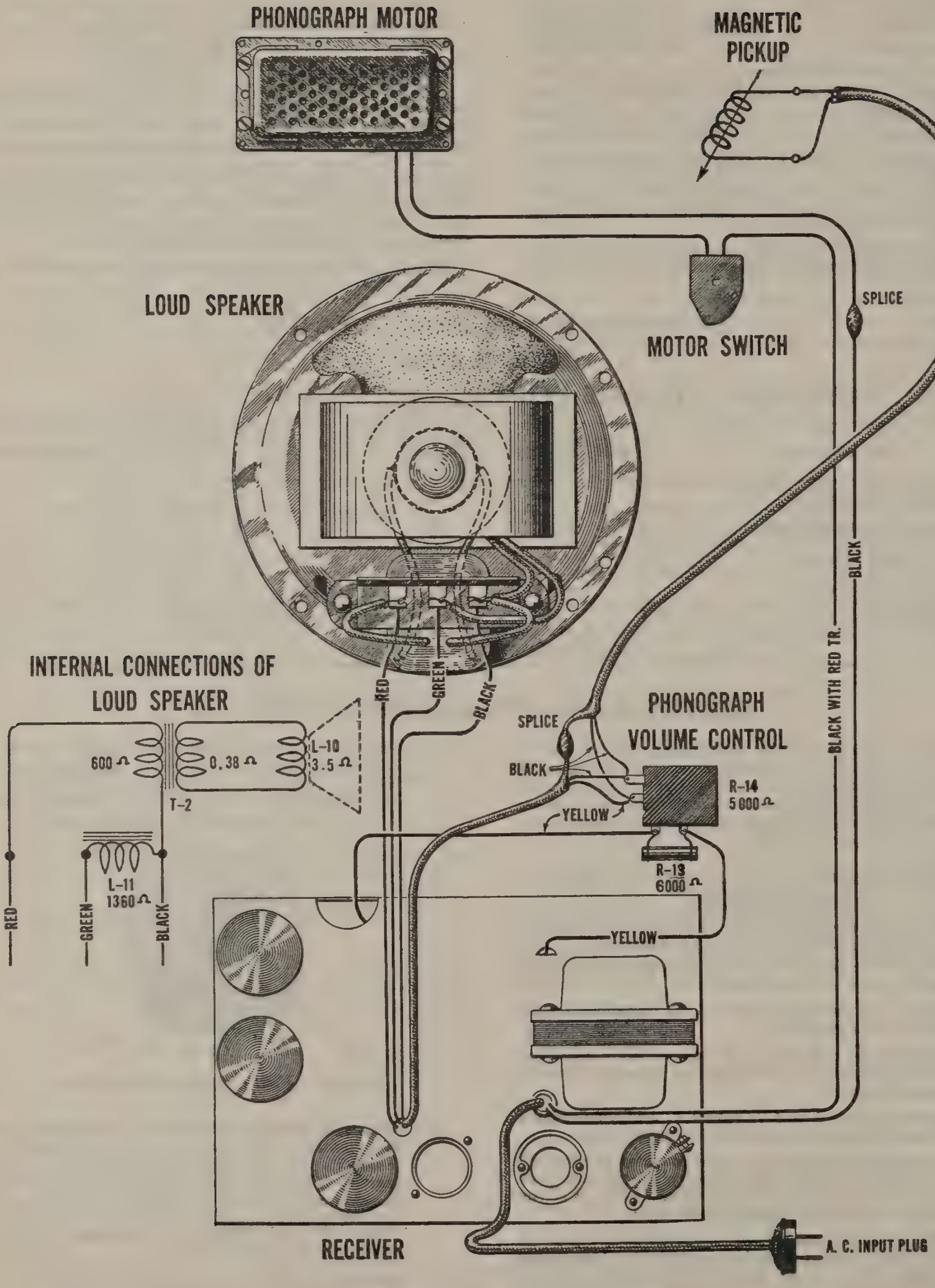

Figure B—Assembly Wiring

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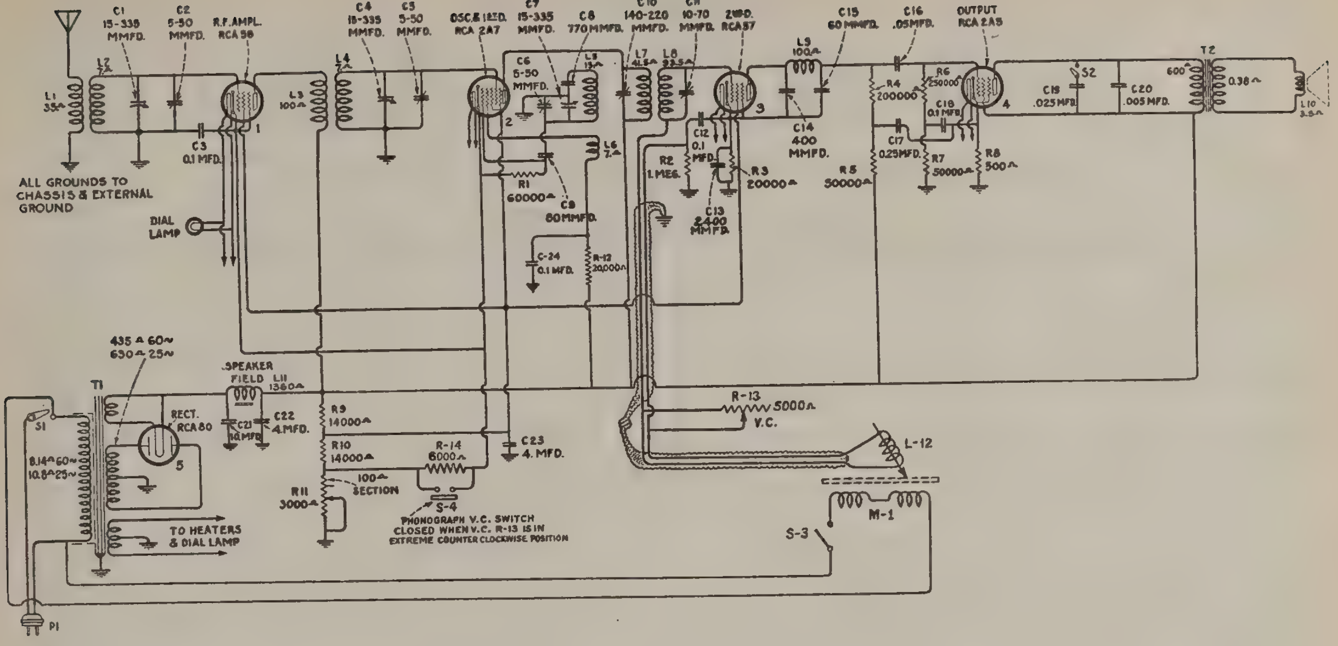

Figure C—Schematic Circuit

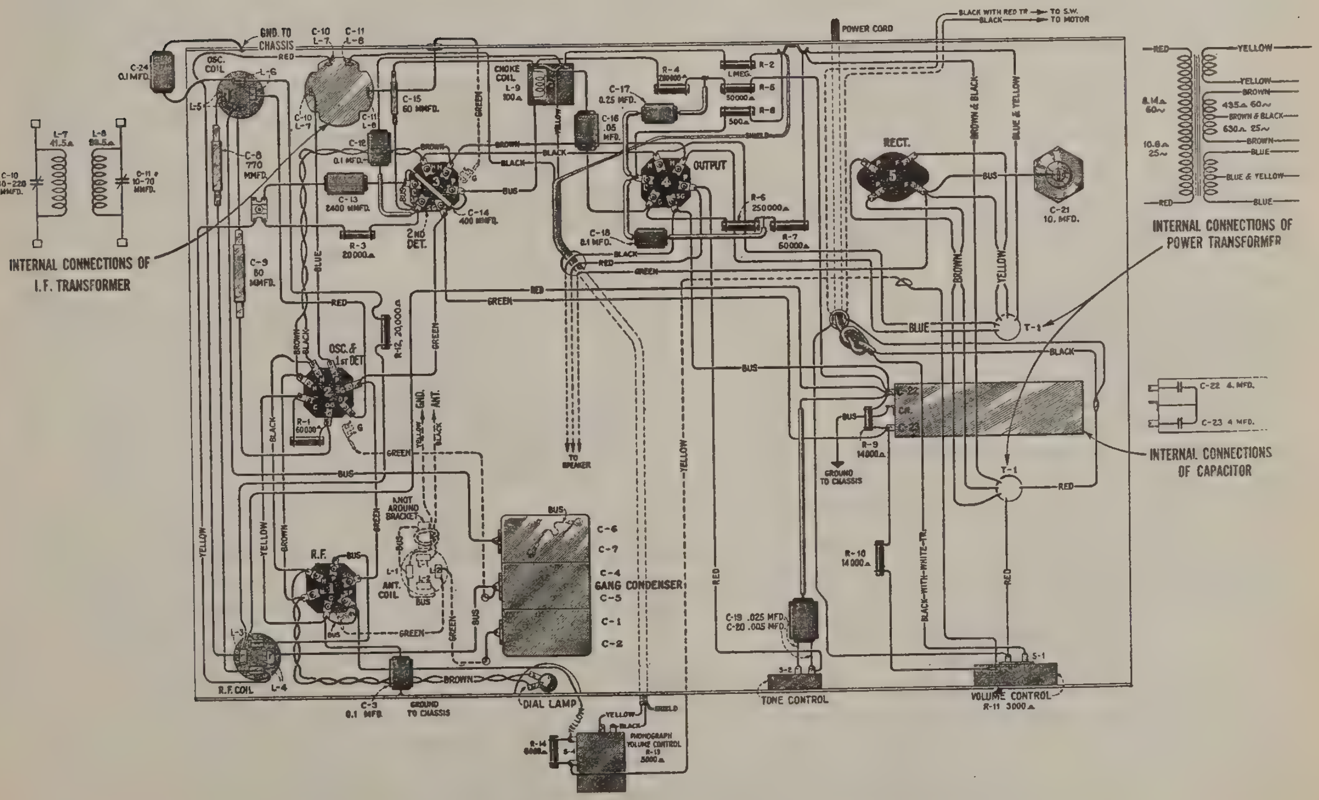

Figure D—Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2563	Resistor—6,000 ohms—Carbon type—1 watt—Package of 5	$1.10
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	.35
2994	Coil—R. F. choke coil	.45
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd.	.44
3459	Capacitor—80 mmfd.	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3590	Escutcheon—Station selector escutcheon—Package of 5	1.40
3591	Escutcheon—Name plate escutcheon—Package of 5	1.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5.	1.10
3604	Capacitor—400 mmfd.	.30
3605	Capacitor—770 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one 0.25 mfd. capacitors	.40
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6470	Coil—Antenna coil	1.08
6471	Coil—Oscillator coil assembly	.74
6472	Coil—R. F. coil assembly	.94
6473	Scale—Dial scale assembly	.50
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—3 gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd., in container	1.64
7590	Capacitor—10 mfd.	1.40
8985	Transformer—Power transformer—105–125 volts—50–60 cycles	4.26
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
9034	Transformer—Power transformer step-down—250–125 volts—50–60 cycles	4.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9003	Coil assembly—Comprising field coil, magnet and cone support	2.35
	MOTOR ASSEMBLIES	
3731	Motor mounting assembly—Comprising three felt washers, three cushions, six metal washers and three studs	$0.46
8989	Motor—Motor complete 105–125 volts—60 cycle	18.52
8990	Motor—Motor complete 105–125 volts—50 cycle	18.52
8991	Motor—105–125 volts—40 cycles	23.36
8992	Motor—Motor complete 105–125 volts—25 cycle	23.36
8993	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105–125 volts 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105–125 volts—40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105–125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3521	Cover—Pickup back cover	.18
3600	Coil—Pickup coil	.50
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Tone control or operating switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control	1.25
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

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RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23177

Printed in U. S. A.

Instructions for

RCA Victor RE-40-P

Double-Range Radio-Phonograph Combination
Five-Tube Table Model

INSTALLATION

Location—The instrument should be placed on a level surface, such as a table, convenient to the antenna and ground connections and to an electrical outlet.

Phonograph—Remove the packing material from the phonograph compartment. With the speed shifter (lever projecting beneath turntable at front left-hand corner) set in the outward (78 R. P. M.) position, mount the turntable (packed in outfit package) on the motor spindle. Make sure that the drive pin engages the slot in the turntable hub. Insert the used-needle cup (also in outfit package) in the opening provided.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver or connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label inside the cabinet.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set is therefore ready to operate when it is removed from the carton and external connections are made as described in the foregoing. The corrugated paper covers, used to protect the tubes during shipment, should be removed before operating the set.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Refer to the tube location diagram on the rating label and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

NOTE—In order to remove the Radiotrons for test or replacement it is necessary to take out the four motorboard screws at the corners of the turntable compartment and raise the motorboard to provide the necessary clearance above the tubes.

OPERATION

The instrument has five operating controls located on the right-hand side panel of the cabinet, as follows:

(1) *Radio Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Record Volume Control* (*Combined with Radio-Record Switch*) (Upper Middle Knob)—For radio operation, this control must be set in the extreme counter-clockwise position. A slight clockwise rotation transfers the switch for phonograph operation—further rotation increases the volume on records.

(3) *Tone Range Switch* (Lower Middle Knob)—This switch has two positions. The counter-clockwise position gives full range reproduction. In the clockwise position, high-frequency (treble) response is decreased; also in this position, static interference (when present) is reduced.

(4) *Station Selector* (Right-hand Knob—Symmetrical with Radio Volume Control)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(5) *Frequency Range Switch* (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540-1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400-2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:

(a) Police Calls—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118-122" for stations operating in the 2450 kilocycle band.

(b) Amateur Radio "Phone"—At dial settings "90-95" (assigned band 1900-2000 kilocycles.)

(c) Aviation Reports, Airport Beacons, Etc.—At dial settings "95-118" (assigned band 2000-2400 kilocycles).

(d) Amateur Radio "CW" (Code)—At dial settings "80-90" (assigned band 1715-1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

RADIO OPERATION

To operate the receiver, proceed as follows:

1. Set the radio-record transfer switch for "Radio" by turning the Record Volume Control to the extreme counter-clockwise position.

2. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (5).

3. Turn on the power and set the Radio Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.

4. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

NOTE—The majority of stations in the 1400-2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540-1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400-2800 kilocycles.

5. For best reproduction reduce the Radio Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Radio Volume Control—never the Station Selector—for regulation of volume.

6. Set the Tone Range Switch for the preferred tone quality.

7. When through operating, turn the Radio Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

PHONOGRAPH OPERATION

Electric phonograph facilities are provided in this instrument for playing either standard (78 R. P. M.) records or long playing (33⅓ R. P. M.) records. The pickup mechanism is designed to use *Chromium Needles for Long Playing Records* (identified by the orange shank) for the reproduction of either long playing or standard records. These needles with care, should play 25 records. *Never re-insert a used Chromium needle after once removing from the pickup.*

Standard (78 R. P. M.) Records—Proceed as follows:

1. Turn the Record Volume Control clockwise from the "Radio"position. Set this control near the middle of its range.

2. Apply power by turning the Radio Volume Control knob slightly clockwise from the "off" position, until the "on" click of the power switch is heard and the dial is illuminated. Several seconds will be required for the Radiotrons to heat before reproduction is possible.

3. Place a standard (78 R. P. M.) record on the turntable. Loosen the needle screw on the electric pickup. Insert a Chromium needle (either orange or green shank), or a full volume (full tone) steel or Tungstone needle, as far as it will go and tighten the needle screw. (Do not play more than one record with each *steel* needle.)

4. Pull the starting lever (right-hand side of turntable) forward to start the turntable. Set the speed shifter (left-hand side of turntable) outward for 78 R. P. M. Then place the needle on the smooth outer surface of the record and slide it into the first groove.

5. Adjust the Record Volume Control to obtain the desired volume.

6. The Tone Range Switch should normally be set in the counter-clockwise position, in which position most faithful reproduction over the entire musical range is obtained. To reduce needle scratch noise, particularly on old type records, this switch may be changed to the clockwise position.

7. When the record has been played, lift the pickup and move it to the right so as to clear the turntable, thereby stopping the motor. (When through playing an eccentric groove record the motor will stop automatically.)

8. When through operating, switch off the power by turning the Radio Volume Control knob to the extreme counter-clockwise position. The pickup should never be left with the needle resting on the record (or turntable) when not operating the phonograph.

Long Playing (33⅓ R. P. M.) Records—Repeat the procedure outlined under "Standard (78 R. P. M.) Records," with the following exceptions:

(1) Use only *Chromium Needles for Long Playing Records* (identified by the orange shank).

(2) Set the speed shifter inward, for 33⅓ R. P. M. This should be done while the turntable is rotating.

Lubrication—The motor should be lubricated with light oil once every six months. Two oil holes on top of the motor are accessible when the turntable is removed. The ball bearing mechanism under the turntable should be lubricated once a year by prying off the cover and packing with vaseline or light motor grease, being careful to prevent any dirt particles from entering with the grease. Make sure that the speed shifter is in the outward (78 R. P. M.) position before replacing the turntable on the spindle.

SERVICE DATA

Voltage Rating..................................115 Volts
Frequency Rating...........25–40 Cycles and 50–60 Cycles
Power Consumption...................60 Cycles, 95 Watts
Number and Types of Radiotrons...............1 UX-280,
1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total 5
Undistorted Output............................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.
and 1400 K. C. to 2800 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, two-point tone control, single heater type Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard RCA Victor two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

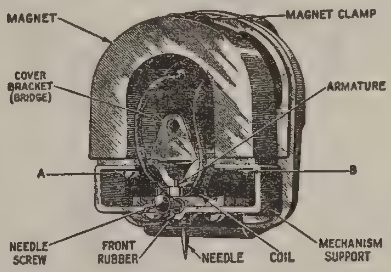

Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

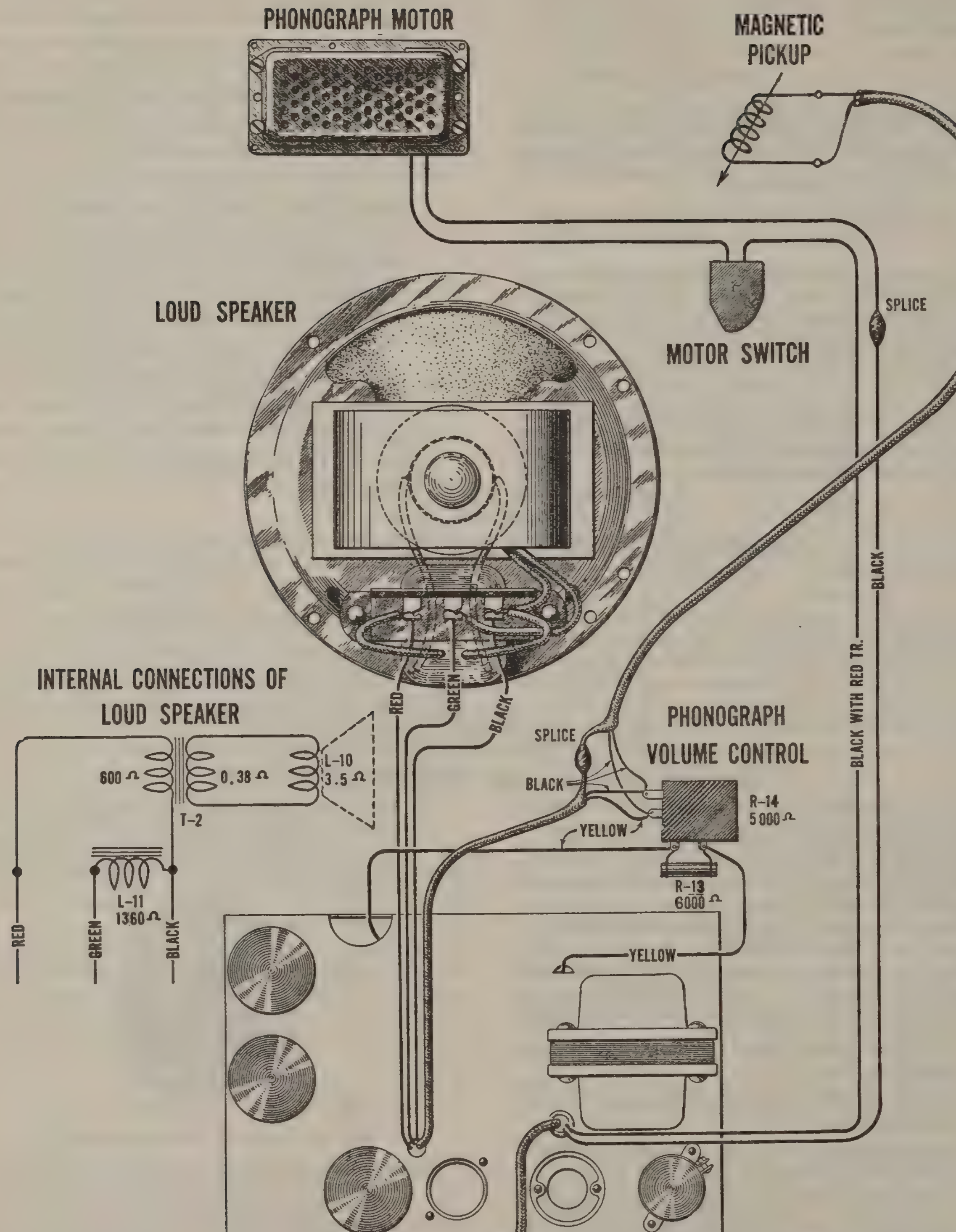

Figure B—Assembly Wiring

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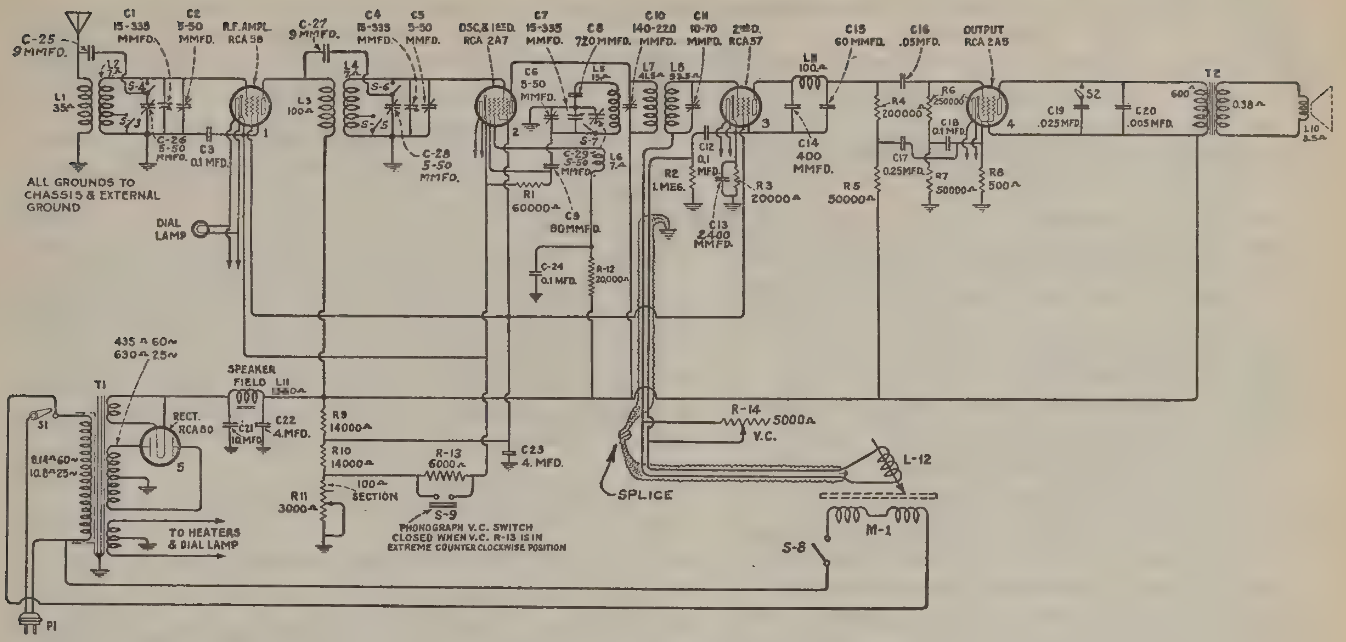

Figure C—Schematic Circuit

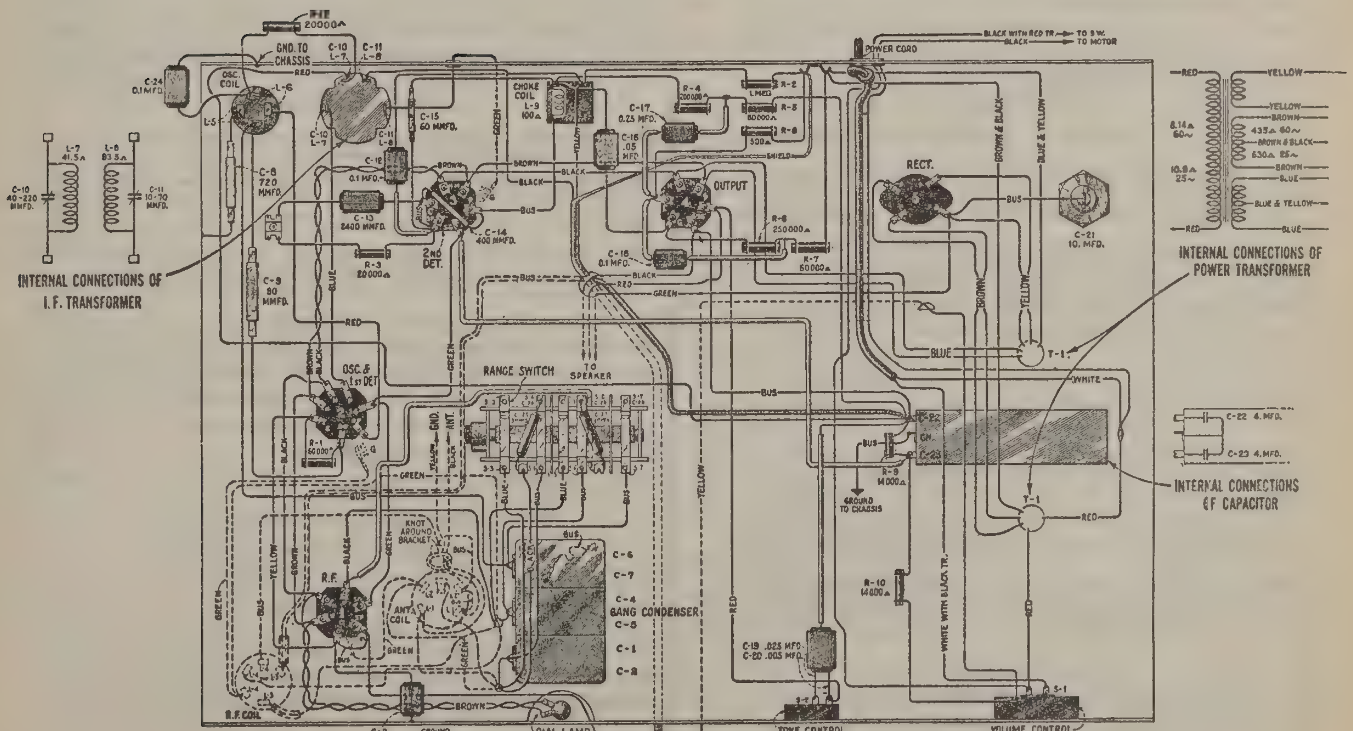

Figure D—Wiring Diagram

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd	$0.75
2563	Resistor—6,000 ohms—Carbon type—1 watt—Located on volume control—Package of 5	1.10
2747	Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd	.35
2994	Coil—R F choke coil	.45
3050	Resistor—14,000 ohms—Carbon type—3 watts	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3456	Capacitor—0.05 mfd	.44
3459	Capacitor—80 mmfd	.44
3472	Capacitor—0.0024 mfd.	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd.—Oscillator filter	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3575	Socket—Dial lamp socket and bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5.	.40
3590	Escutcheon—Station selector escutcheon—Package of 5	1.40
3591	Escutcheon—Name plate escutcheon—Package of 5	1.40
3592	Knob—Station selector or volume control knob—Package of 5	.80
3593	Screw—Chassis mounting screw—Package of 10	.30
3594	Resistor—50,000 ohms—Carbon type—½ watt—Package of 5	1.00
3596	Capacitor—60 mmfd.	.36
3597	Capacitor—0.25 mfd.	.40
3598	Capacitor—0.1 mfd.	.36
3601	Coil—Choke coil	.68
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt—Package of 5.	1.10
3604	Capacitor—400 mmfd.	.30
3606	Capacitor—Comprising one 0.005 mfd. and one .025 mfd. capacitors	.40
3623	Shield—R. F. or oscillator coil shield	.30
3705	Scale—Dial scale assembly	.50
3783	Capacitor—9 mmfd —Package of 2	.50
6228	Resistor—200,000 ohms—Carbon type—½ watt—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	1.10
6464	Transformer—I. F. transformer	1.88
6465	Volume control—Complete with mounting nut	1.22
6466	Switch—Tone control switch	.45
6471	Coil—Oscillator coil assembly	.74
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil assembly	.94
6529	Switch—Range switch	1.25
7485	Socket—Radiotron 6 contact socket	.40
7487	Shield—Radiotron tube shield	.25
7588	Condenser—3 gang variable tuning condenser	2.85
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container	1.64
7590	Capacitor—10 mfd.	1.40
8985	Transformer—Power transformer—105–125 volts—50–60 cycles	4.26
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
9034	Transformer—Step-down—250–125 volts—50–60 cycles	4.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer	1.44
8987	Cone—Reproducer cone—Package of 5	5.00
9003	Coil assembly—Comprising field coil, magnet and cone support	2.35

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3599	Motor mounting washer assembly—Comprising one screw, one washer and one lockwasher—Package of 3 sets	$0.30
8989	Motor—Motor complete 105–125 volts—60 cycle	18.52
8990	Motor—Motor complete 105–125 volts—50 cycle	18.52
8991	Motor—105–125 volts—40 cycle	23.36
8992	Motor—Motor complete 105–125 volts—25 cycle	23.36
8993	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105–125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105–125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105–125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3600	Coil—Pickup coil	.50
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Tone control, band selector or operating switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control	1.25
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

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RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor Models R-51-B and R-53-B

10-Tube Battery-Operated Superheterodyne Receivers

INSTALLATION

Preliminary—After unpacking the instrument, remove the interior packing material on top of the chassis. (On the *console* model, first remove the unfinished wood shipping strip fastened across the rear of the chassis.) Place the instrument where connections can be made conveniently to the antenna and ground. If the instrument is of the *table mounting* type, it should preferably be located where the battery cable will reach a compartment suitable for concealing the batteries (the *console* model provides space within the cabinet for all batteries).

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Batteries—The following batteries are required:

"A" Battery—One Eveready Air Cell, No. A-600.

"B" Battery—Four 45-volt dry batteries. The cabinet of the *console* model is designed to hold standard size batteries, such as: Eveready No. 485 or 772; Burgess No. 22308 or 2308; or equivalent. For the *table* model (with externally mounted batteries), somewhat greater economy will normally be obtained by using extra large (heavy duty) batteries, such as: Eveready No. 486 or 770; Burgess No. 21308 or 10308; or equivalent.

"C" Battery—One 4½ volt *tapped* "C" battery (having a "–3" volt terminal), such as Eveready No. 771-T, Burgess No. 2370, or equivalent.

Make certain that the on–off switch, on the right-hand side (viewing the front) of the cabinet, is in the "off" position. Then connect the batteries *exactly* as shown by the battery connection diagram on the rear of the chassis. Separate insulated wires are furnished for necessary connections between the batteries.

Radiotrons—Refer to the tube location diagram on the license label inside the cabinet, and install the Radiotrons as follows:

(1) Unpack the Radiotrons carefully and insert them in the proper sockets.

(2) Press the metal shields down firmly over the Radiotrons indicated by double circles.

(3) Connect the short flexible leads, equipped with spring contacts, securely to the top grid terminals of the proper RCA-34 Radiotrons.

OPERATION

The operating controls on the front panel are shown in Fig. 1. Proceed as follows:

1. Set the On–Off Switch, on the right side (facing the front) of the cabinet, to the "on" position.

2. Advance the Volume Control about one half turn from the extreme counter-clockwise position and turn the Station Selector in either direction until a station is heard. (The dial scale is calibrated in kilocycles to facilitate location and identification of stations.) If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Selector.

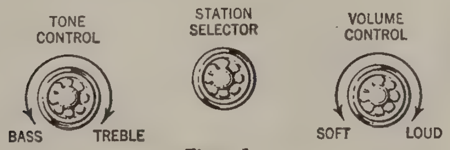


Figure 1

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. This setting provides the fine quality of reproduction possible with this instrument.

4. Adjust the Volume Control to obtain the desired volume.

NOTE—The automatic volume control maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength may be received at approximately the same volume without readjustment of the Volume Control.

5. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

6. When through operating, set the On–Off switch to the "off" position.

NOTE—Improved performance may sometimes be obtained by interchanging the three RCA-34 Radiotrons in their respective sockets.

Important—To avoid damage to the Radiotrons, always set the On–Off Switch in the "off" position while interchanging or replacing Radiotrons, or while new batteries are being installed.

Fuse—The Radiotron filaments are protected by a 0.5 ampere fuse connected in the "B+" (red) lead from the on-off switch. Should the receiver at any time fail to operate, separate the coupling-type fuse holder and examine the fuse (being careful not to lose the tubular spacer, which is necessary to insulate the fuse from the metal holder). If the fuse is burned out, check all battery connections and have all tubes tested by your dealer before installing a new fuse. This is a special fuse—obtain replacement fuses from your dealer—*do not use any substitute for this fuse.*

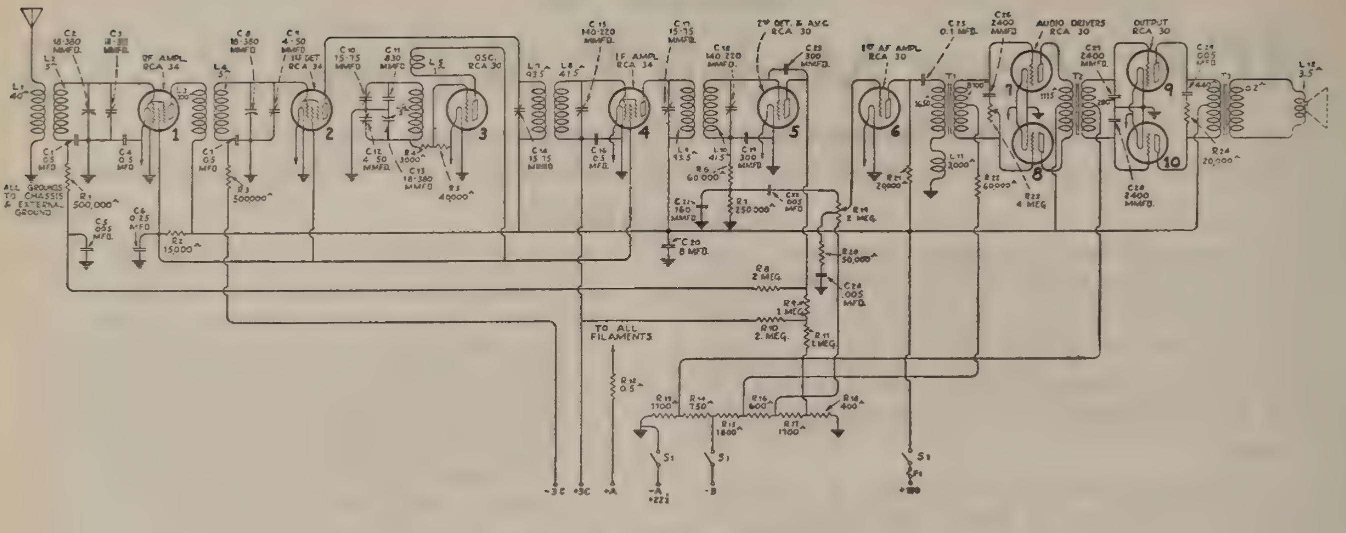
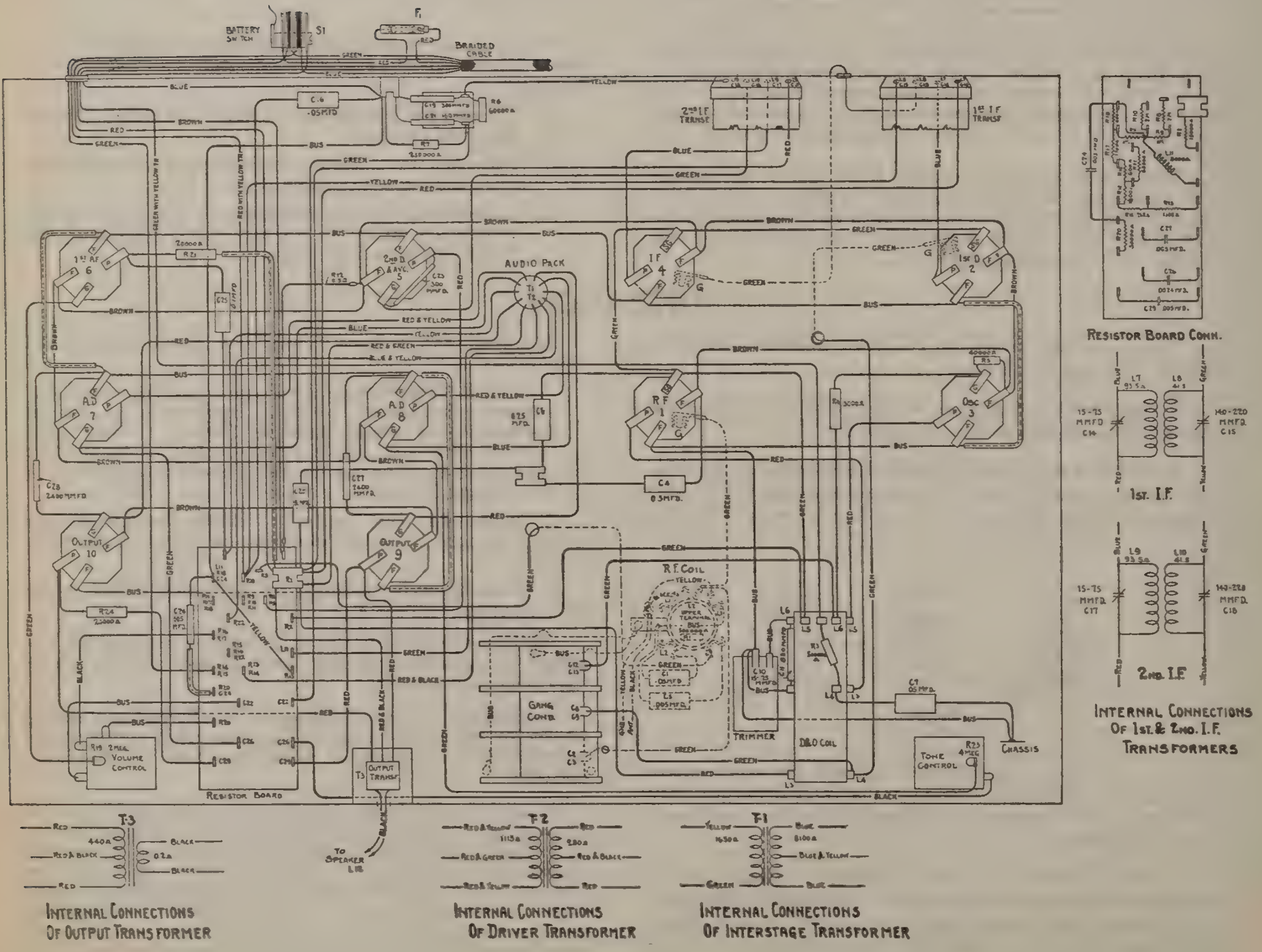


Figure A—Schematic Circuit



RESISTOR BOARD CONN.

INTERNAL CONNECTIONS OF 1ST. & 2ND. I.F. TRANSFORMERS

INTERNAL CONNECTIONS OF OUTPUT TRANSFORMER

INTERNAL CONNECTIONS OF DRIVER TRANSFORMER

INTERNAL CONNECTIONS OF INTERSTAGE TRANSFORMER

Figure B—Wiring Diagram

SERVICE DATA

Total "A" Battery Current.............................0.6 Ampere
Average "B" Battery Current.............................18 M. A.
Type and Number of Radiotrons......7 RCA-230, 3 RCA-234—Total, 10
Undistorted Output.......................................1.6 Watts

This receiver is a ten-tube battery operated Super-Heterodyne giving excellent performance. Features such as automatic volume control, continuously variable tone control, double class "B" audio amplifier, low "A" and "B" battery current drain, permanent magnet dynamic loudspeaker, exceptional fidelity, large undistorted output, compensated volume control, and the inherent sensitivity, selectivity, and tone quality of the Super-Heterodyne characterize this instrument. The performance of this receiver is comparable in all respects to a modern A. C. receiver of similar design.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis. A tube base with a 16000 ohms resistor connected between one filament prong and the plate prong must be substituted for the oscillator tube.

(c) Connect the oscillator output between the first detector control grid and the negative terminal on the 4.5 volt bias battery. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter. Also a socket wrench is necessary for the main tuning capacitor trimmers.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the first line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
R. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Oscillator—RCA-230	—	—	65.0	4.0	2.15
First Detector—RCA-234	5.0	65.0	157.5	1.0	2.15
I. F.—RCA-234	2.0	65.0	157.5	3.0	2.15
Second Detector—RCA-230	0	—	—2.0	0	2.15
First A. F.—RCA-230	10.5	—	130.0	1.25	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Driver A. F.—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15
Power—RCA-230	13.5	—	150.0	1.5	2.15

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushion—Package of 4	.30
3033	Resistor—1 megohm—Carbon type—¼ watt—Package of 5	1.00
3088	Knob—Operating switch knob—Package of 5	.50
3114	Resistor—50,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3238	Screw—Set screw for switch knob No. 3088—Package of 10	.25
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3382	Resistor—750 ohms—Carbon type—½ watt—Package of 5	1.00
3449	Coil—Choke coil located on resistor board	1.12
3472	Capacitor—0.0024 mfd.	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil	.34
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3616	Capacitor—300 mmfd.	.34
3634	Capacitor—160 mmfd.	.34
3640	Capacitor—0.05 mfd.	.25
3643	Capacitor—0.005 mfd.	.25
3702	Capacitor—0.25 mfd.	.42
3703	Resistor—1,700 ohms—Carbon type—¼ watt—Package of 5	1.00
3704	Resistor—400 ohms—Carbon type—¼ watt—Package of 5.	1.00
3706	Resistor—1,800 ohms—Carbon type—¼ watt—Package of 5	1.00
3707	Volume control—Complete with mounting nut	1.40
3708	Resistor—600 ohms—Carbon type—¼ watt—Package of 5	1.00
3743	Resistor—0.5 ohm—Flexible type—Package of 5	1.00
3744	Resistor—250,000 ohms—Carbon type—¼ watt—Package of 5	1.00
3748	Fuse—½ ampere—Package of 5	.40
3749	Capacitor—0.1 mfd.	.30
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6143	Resistor—40,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6176	Escutcheon—Operating switch escutcheon—Package of 5	$0.50
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5	1.00
6192	Spring—3 gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—¼ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang tuning condenser drive cord—Package of 5	.60
6300	Socket—UX Radiotron socket	.35
6320	Capacitor—670 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
6332	Switch—Operating switch	1.60
6449	Tone control complete with mounting nut	1.06
6512	Capacitor—0.005 mfd.	.28
6516	Connector—Fuse connector	.16
6522	Shield—Radiotron shield	.30
6523	Transformer—Audio transformer assembly comprising driver transformer and interstage transformer	5.24
6524	Transformer—First intermediate frequency transformer	2.28
6525	Transformer—Second intermediate frequency transformer.	2.25
6526	Transformer—Output transformer	1.80
6533	Condenser—3 gang variable tuning condenser	5.55
6544	Coil—Antenna coil assembly	.85
6545	Coil—Detector oscillator coil	2.44
6546	Scale—Dial and dial scale	.75
6548	Capacitor—8.0 mfd. capacitor	.95
6549	Cable—Battery connecting cable	1.25
6604	Capacitor—0.5 mfd.	.50
7062	Capacitor—Adjustable trimming capacitor 15 to 70 mmfd.	.50
7439	Drum—Dial drum with set screws and 3 dial mounting nuts.	.35
7523	Escutcheon—Station selector escutcheon	.50
	REPRODUCER ASSEMBLIES	
8920	Ring—Cone retaining ring	.35
9431	Bracket—Cone bracket and magnet assembly	8.10
9432	Cone—Reproducer cone complete with voice coil	1.89

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23531

Printed in U. S. A.

SERVICE NOTES
for
RCA Victor Models R-71 and R-72

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Power Consumption	25–40 Cycles, 90 Watts; 50–60 Cycles, 80 Watts
Type of Circuit	Super-Heterodyne
Type and Number of Radiotrons	3 RCA-58, 3 RCA-56, 1 RCA-247, and 1 UX-280—Total 8
Number of R. F. Stages	One
Number of I. F. Stages	One
Type of Second Detector	Power Self Biasing
Type of Tone Control	Variable resistance in series with condenser that tunes secondary of interstage transformer at "low" position
Type of Automatic Volume Control	RCA-56 controlling R. F. and I. F. stages by means of drop across resistor in plate circuit constituting bias on R. F. and I. F. stages. Manual volume control varies grid bias on A. V. C. tube
Number of Audio Stages	One—Single Pentode
Type of Rectifier	Full Wave, UX-280
Undistorted Output	2.25 Watts

PHYSICAL SPECIFICATIONS—R-71

Height	18 11/16 Inches
Depth	10 21/32 Inches
Width	14 Inches
Weight Alone	34 Pounds
Weight Packed for Shipment	42 Pounds

PHYSICAL SPECIFICATIONS—R-72

Height	38½ Inches
Depth	11 11/16 Inches
Width	23 Inches
Weight Alone	58 Pounds
Weight Packed for Shipment	79 Pounds

RCA Victor Models R-71 and R-72 are eight tube Super-Heterodyne radio receivers incorporating such features as Automatic Volume Control, Pentode output, New R. F. Super Control Pentodes, High Efficiency General Purpose Radiotrons and the inherent sensitivity, selectivity and tone quality of the RCA Victor Super-Heterodyne.

Model R-71 is a table type receiver and the R-72 is of the Console type. Except for the loudspeaker, both models are identical. The R-71 uses a six inch speaker while the R-72 uses an eight inch unit.

A reference to the Service Notes already published on the R-11 and R-7 will give details of any service information required on these receivers. Figure 1 shows the schematic diagram and Figure 2 the wiring. The voltage readings are listed below and the replacement parts on the following pages.

120 VOLT A. C. LINE

Radiotron No.	Cathode to Heater, Volts, D. C.	Cathode or Filament to Control Grid, Volts, D. C.	Cathode or Filament to Screen Grid, Volts, D. C.	Cathode or Filament to Plate, Volts, D. C.	Plate Current, M. A.	Heater or Filament, Volts, D. C.
VOLUME CONTROL AT MINIMUM						
1—R. F.	**2.0	*1.2	110	280	0	2.5
2—1st Det.	0	*1.5	110	280	0	2.5
3—Osc.	—	—	—	90	5.5	2.5
4—I. F.	**2.0	*2.0	110	280	0	2.5
5—A. V. C.	—	1.0	—	10	0	2.5
6—2nd Det.	—	6.0	—	260	1.0	2.5
7—Pwr.	—	20.0	275	265	35.0	2.5
VOLUME CONTROL AT MAXIMUM						
1—R. F.	**4.0	*0.1	100	260	5.0	2.5
2—1st Det.	**10.0	*1.0	95	250	2.0	2.5
3—Osc.	—	—	—	75	4.5	2.5
4—I. F.	**4.0	*1.8	100	260	3.0	2.5
5—A. V. C.	—	2.0	—	20	0	2.5
6—2nd Det.	—	7.0	—	240	1.0	2.5
7—Pwr.	—	20.0	275	265	30.0	2.5

* On 5 Volt, 1000 Ohm per Volt Meter.
** On 50 Volt, 1000 Ohm per Volt Meter.

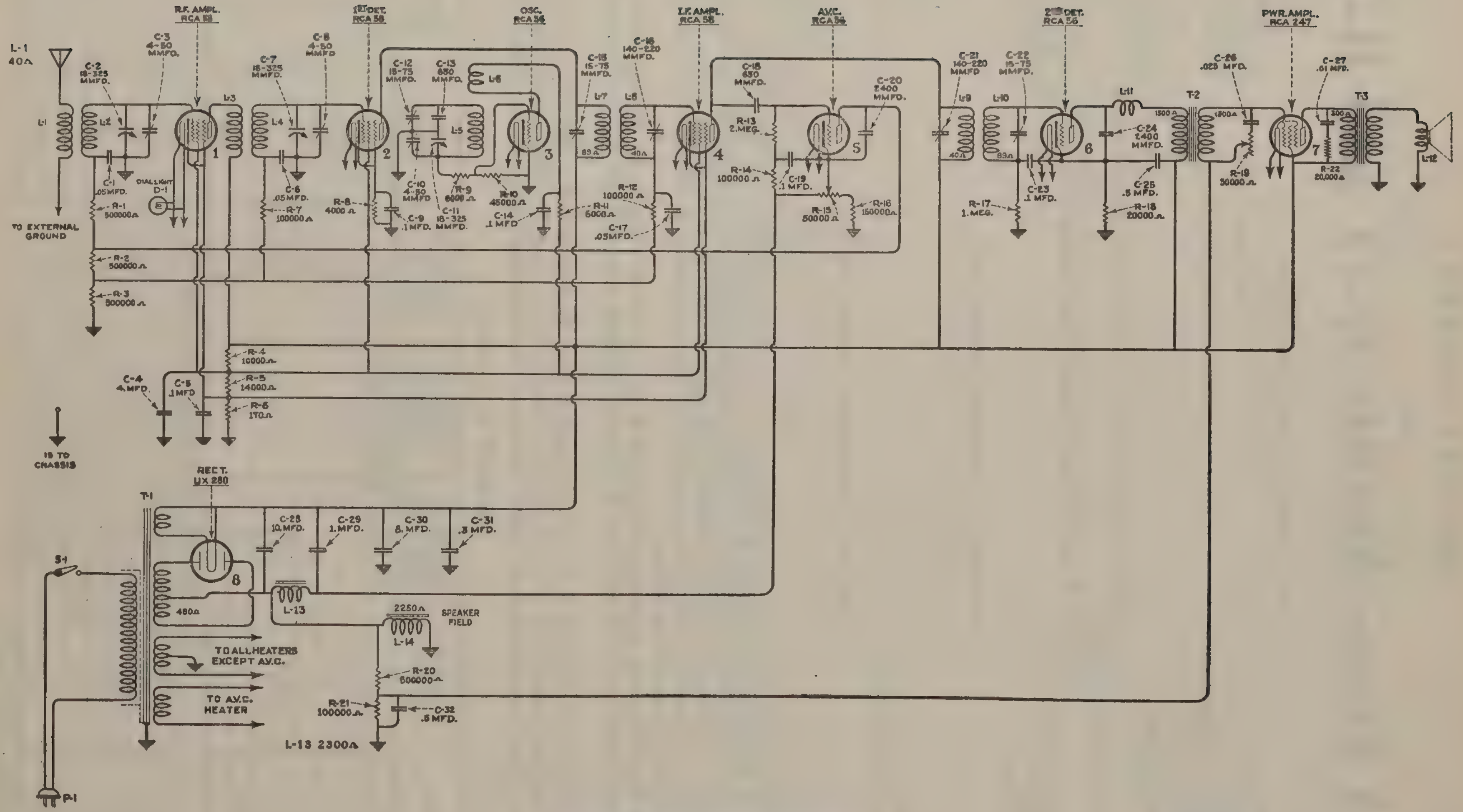


Figure 1—Schematic Circuit Diagram

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2563	Resistor—6,000 ohms—Carbon type—1 watt—Package of 5	$3.00
2746	Socket—Dial lamp socket	.50
2747	Cap—Grid connector cap—Package of 5	.50
2749	Capacitor—2,400 mmfd.	1.50
3003	Cushion—Sponge rubber cushion for mounting receiver chassis—Package of 4	.50
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	2.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	2.75
3360	Resistor—150,000 ohms—Carbon type—½ watt—Package of 5	2.50
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	2.00
6186	Resistor—500,000 ohms—Carbon type—¼ watt—Package of 5	2.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	2.00
6192	Spring—Condenser drive cord tension spring—Package of 10	.50
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	2.00
6288	Knob—Station selector—Volume control or tone control knob—Package of 5	1.50
6298	Cord—Tuning condenser drive cord—Package of 5	1.00
6300	Socket—4-prong radiotron socket—1 used	.55
6301	Reactor—Filter reactor	2.00
6302	Bracket—Dial lamp bracket assembly	.50
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	2.50
6304	Resistor—170 ohms—Carbon type—½ watt—Package of 5	2.50
6306	Resistor—14,000 ohms—Carbon type—1 watt—Package of 5	2.50
6307	Tone control complete with mounting nut	1.60
6308	Coil—R. F. coil	1.90
6309	Transformer—1st intermediate transformer	3.00
6310	Transformer—2nd intermediate transformer	3.00
6311	Board—Resistor board less resistors and capacitors	1.75
6312	Capacitor—650 mmfd.—Oscillator series capacitor—Package of 5	2.50
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5	2.50
6317	Capacitor—0.05 mfd. capacitor	.70
6318	Resistor—10,000 ohms—20 watt	1.00
6319	Capacitor—0.01 mfd.—Located on resistor board	.60
6321	Coil—2nd detector plate choke coil	1.10
6322	Volume control complete with mounting nut	1.65
6323	Shaft—Tuning condenser drive shaft complete with one flat washer and two "C" washers—Package of 2	.85
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable capacitor—15 to 70 mmfd.	1.00
7362	Capacitor—0.025 mfd.—Located on resistor board	1.00
7439	Drum—Dial drum with set screws	.50
7440	Scale—Tuning dial scale	.75
7484	Socket—5-contact radiotron socket—4 used	.65
7485	Socket—6-prong radiotron socket—3 used	.70
7487	Shield—Radiotron shield—6 used—Plain finish	.50
7488	Shield—Radiotron shield top—1 used—Plain finish	.50

Stock No.	DESCRIPTION	List Price
7501	Capacitor—3-gang variable tuning capacitor—Less drive shaft and drum	$5.20
7502	Capacitor pack—Comprising one 10. mfd., one 1 mfd., two 0.5 mfd., one 8. mfd., five 0.1 mfd., one 0.3 mfd. and one 4. mfd. capacitors in metal container	8.25
7504	Coil—1st detector and oscillator coil complete with mounting bracket	3.50
8837	Support—Receiver chassis metal mounting support—Package of 4	.70
8917	Transformer—Audio transformer assembly comprising interstage and output transformer in metal container	4.50
8918	Transformer—Power transformer—110–120 volts—50–60 cycles	8.00
8922	Transformer—Power transformer—110–120 volts—25–50 cycles	10.00
8923	Transformer—Power transformer—220–240 volts—50–60 cycles	7.00
	R-71 CABINET ASSEMBLIES (Prices Furnished Upon Application)	
X118	Baffle board and grille cloth	
X119	Cabinet—Complete less equipment	
6113	Foot—Cabinet felt foot—Package of 15	
7441	Escutcheon—Station selector escutcheon with mounting screws	
	R-72 CABINET ASSEMBLIES (Prices Furnished Upon Application)	
X64	Foot—Cabinet foot	
X109	Top—Cabinet top	
X110	Panel—Control panel	
X111	Stretcher assembly—Comprising 1 center and 2 end rails	
X112	Board—Baffle board and grille cloth	
X113	Moulding—Control panel moulding	
X114	Moulding—Front end rail moulding—1 pair	
X115	Ornament—Control panel ornament—1 pair	
X116	Moulding—Control panel bottom moulding	
X117	Cabinet—Complete less equipment	
7441	Escutcheon—Station selector escutcheon	
	R-71 REPRODUCER ASSEMBLIES	
2975	Rivet—Cone retaining ring mounting rivet—Package of 100	.50
3237	Screw assembly—Reproducer mounting screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets—Package of 1 set	.50
6182	Board—Terminal board with three terminals—Package of 5	.50
8702	Ring—Cone retaining ring	.80
8921	Cone—Reproducer cone with voice coil—Package of 5	7.50
9417	Coil—Reproducer field coil assembly—Comprising coil, cone housing and magnet	6.00
	R-72 REPRODUCER ASSEMBLIES	
3237	Screw assembly—Reproducer mounting screw assembly—Comprising 4 screws, 8 nuts, 4 washers and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board—3 terminals	.50
8919	Cone—Reproducer cone complete with voice coil—Package of 5	12.50
8920	Ring—Cone retaining ring	.50
9416	Coil—Reproducer field coil—Comprising coil, cone housing and magnet	5.00

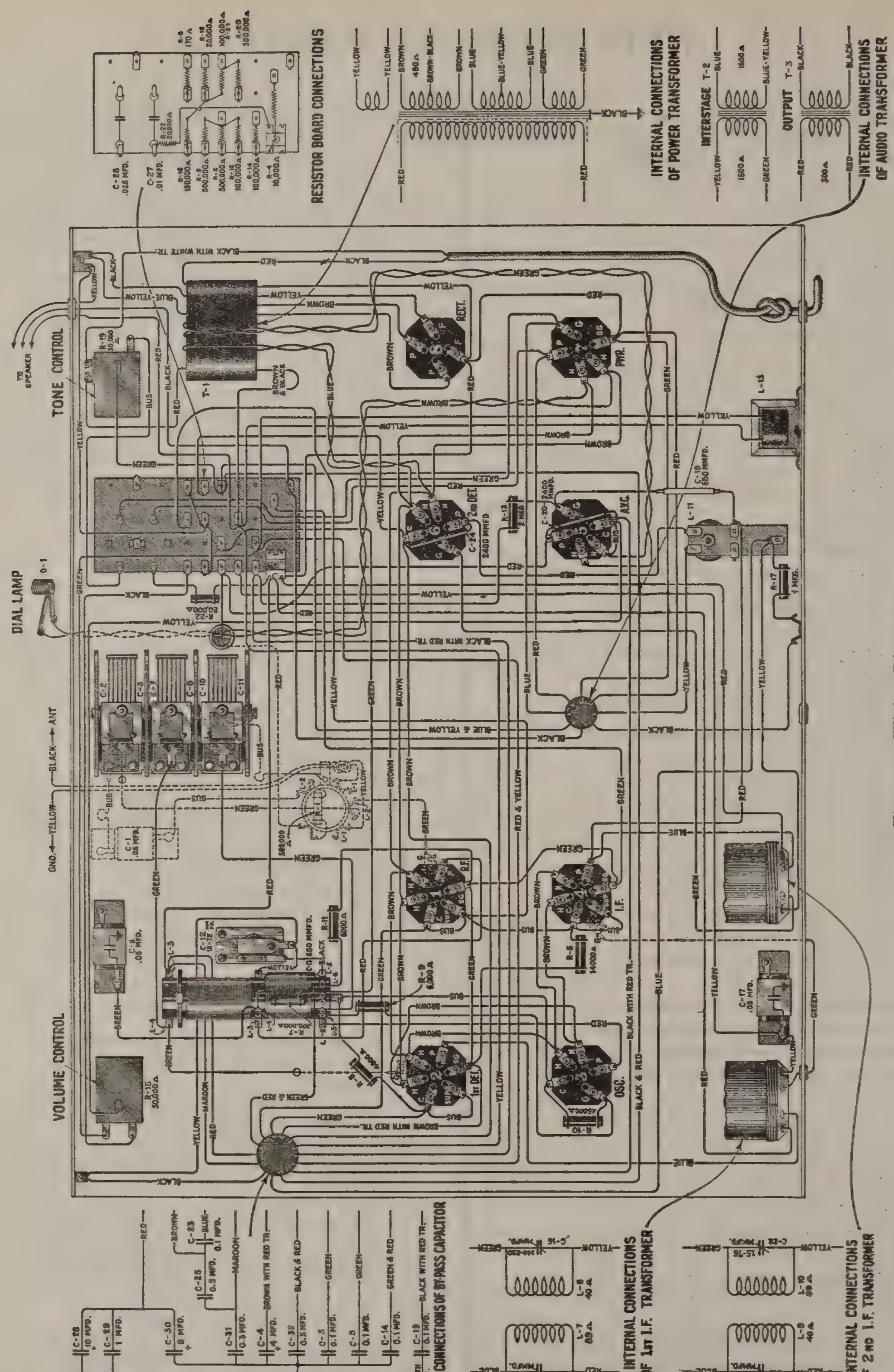

RESISTOR BOARD CONNECTIONS
INTERNAL CONNECTIONS OF POWER TRANSFORMER
INTERSTAGE T-2
OUTPUT T-3
INTERNAL CONNECTIONS OF AUDIO TRANSFORMER
TONE CONTROL
TO SPEAKER
DIAL LAMP
VOLUME CONTROL
GND.
ANT
RECT.
PWR.
2nd DET.
A.V.C.
R.F.
I.F.
1st DET.
OSC.
T-1
L-13
L-11
INTERNAL CONNECTIONS OF BY-PASS CAPACITOR
INTERNAL CONNECTIONS OF 1st I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 2nd I.F. TRANSFORMER

Figure 2—Wiring Diagram

SERVICE DIVISION
RCA Victor Company, Inc.
Camden, N. J., U. S. A.

Sig. I

SERVICE NOTES
for
RCA Victor Model R-71-B

ELECTRICAL SPECIFICATIONS

"A" Batteries Required	Eveready Aircell "A" Battery
"B" Batteries Required	Four 45 Volt Blocks, Preferably of Heavy Duty Type
"A" Battery Current	0.48 Amperes
Average "B" Battery Current	18 M. A.
Type of Circuit	Super-Heterodyne with A. V. C., Class "B" Output Stage and Compensated Volume Control
Type and Number of Radiotrons	3 RCA-234, 1 RCA-232, 4 RCA-230—Total 8
Number of R. F. Stages	One
Number of I. F. Stages	One
Type of Second Detector	Pentode, Combining Detector, A. V. C. and Audio Amplification
Number of Audio Stages	Two
Undistorted Output	1.00 Watt

PHYSICAL SPECIFICATIONS

Height	18 11/16 Inches
Depth	10 21/32 Inches
Width	14 Inches
Weight Alone	34 Pounds
Weight Packed for Shipment	40 Pounds

RCA Victor Model R-71-B is an eight tube battery operated Super-Heterodyne radio receiver incorporating such features as Super-Control R. F. Amplifier Pentode Radiotrons in the R. F. and I. F. stages, automatic volume control, combination Pentode second detector, compensated Class "B" audio amplifier and the inherent sensitivity, selectivity and tone quality of the RCA Victor Super-Heterodyne. The chassis and permanent magnet dynamic loudspeaker are enclosed in a standard R-71 cabinet. The performance of this receiver is comparable in all respects to the A. C. model of the same designation, except in output volume.

SERVICE DATA

Except for different chassis design the circuit used in the R-71-B is very similar to that of the P-31 Portable Radiola. A reference to this Service Note should therefore be made for a description of the circuit and manner of making adjustments. The voltage readings are given below and the replacement parts on page 3. Figure 1 shows the schematic circuit diagram and Figure 2 the chassis wiring diagram.

RADIOTRON SOCKET VOLTAGES
(No signal being received)

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Screen Current M. A.	Plate Current M. A.	Filament Volts
1. R. F.	0.2	65	157	1.0	3.0	2.0
2. 1st Detector	0.5	65	157	0.1	0.2	2.0
3. Oscillator	1.0	—	65	—	4.0	2.0
4. I. F.	0.5	65	157	1.0	3.0	2.0
5. 2d Detector	2.0	155	0	4.0	0	2.0
6. 1st A. F.	1.0	—	155	—	2.5	2.0
7. Power	14.0	—	155	—	1.2	2.0
8. Power	14.0	—	155	—	1.2	2.0

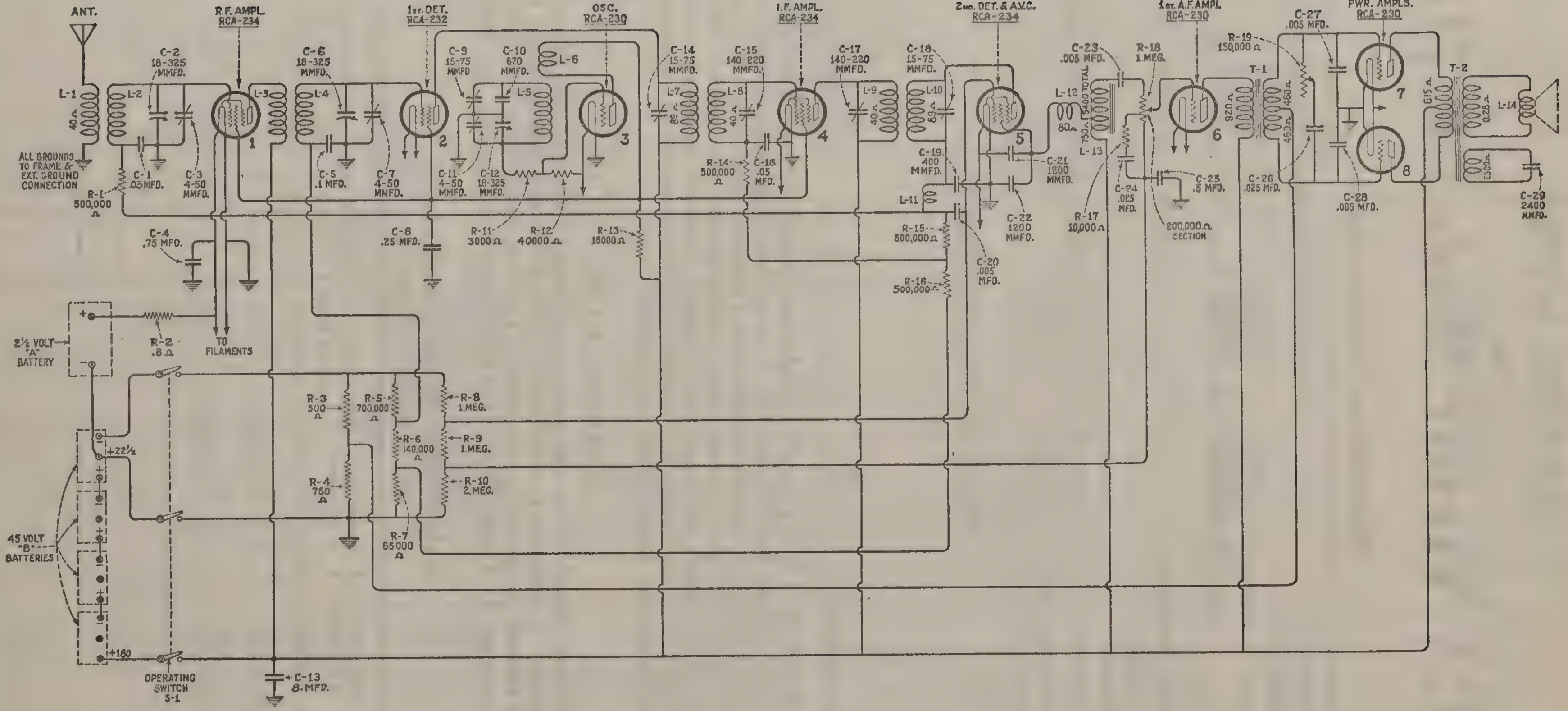


Figure 1—Schematic Wiring Diagram of R-71-B

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2012	Capacitor—1200 mmfd. capacitor	$0.55
2747	Contact cap—Package of 5	.50
2749	Capacitor—2400 mmfd.	.35
2962	Capacitor—0.005 mfd. capacitor	.60
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3033	Resistor—1 megohm—¼ watt—Carbon type—Package of 5	1.00
3043	Resistor—0.8 ohm—Wire wound	.35
3085	Capacitor—400 mmfd. capacitor	.30
3088	Knob—Operating switch knob—Package of 5	.50
3238	Screw—Set screw for switch knob No. 3088—Package of 10	.25
3252	Resistor — 100,000 ohms — ½ watt — Carbon type—Package of 5	1.00
3358	Resistor—3,000 ohms—½ watt—Carbon type—Package of 5	1.00
3381	Resistor—10,000 ohms—¼ watt—Carbon type—Package of 5	1.00
3382	Resistor—750 ohms—½ watt—Carbon type—Package of 5	1.00
3383	Resistor—500 ohms—½ watt—Carbon type—Package of 5	1.00
6176	Escutcheon—Operating switch escutcheon—Engraved "OFF—ON"—Package of 5	.50
6186	Resistor — 500,000 ohms — ¼ watt — Carbon type—Package of 5	1.00
6192	Spring—Condenser drive cord tension spring—Package of 10	.30
6241	Resistor — 140,000 ohms — ¼ watt — Carbon type—Package of 5	1.00
6242	Resistor—2 megohm—¼ watt—Carbon type—Package of 5	1.00
6244	Resistor — 700,000 ohms — ¼ watt — Carbon type—Package of 5	1.00
6245	Resistor — 65,000 ohms — ¼ watt — Carbon type—Package of 5	1.00
6279	Resistor — 15,000 ohms — ½ watt — Carbon type—Package of 5	1.00
6285	Choke coil—2nd detector plate choke coil	.72
6288	Knob—Station selector, volume control or tone control knob—Package of 5	1.00
6298	Cord—Tuning condenser drive cord—Package of 5	.60
6300	Socket—4 prong Radiotron socket	.35
6308	Coil—R. F. coil complete with mounting bracket	1.36
6312	Capacitor — 650 mmfd. capacitor — Package of 5	$1.50
6317	Capacitor—0.05 mfd. capacitor	.40
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
6326	Transformer — 1st intermediate frequency transformer	2.05
6327	Transformer — 2nd intermediate frequency transformer	2.85
6328	Volume control—Complete with mounting nut	1.45
6329	Tone control—Complete with mounting nut	1.25
6330	Scale—Tuning dial scale	.45
6331	Shield—Radiotron shield	.20
6332	Switch—Operating switch	1.60
6333	Cable—Battery connecting cable	.70
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7439	Drum—Dial drum with set screws	.35
7501	Capacitor—3 gang variable capacitor, less drive shaft and drum	4.20
7524	Coil—Detector and oscillator coil complete with mounting bracket	2.30
7525	Capacitor pack—Comprising one 8.0 mfd., one 0.05 mfd., one 0.1 mfd., one 0.5 mfd., one 0.25 mfd., one 0.75 mfd., two 0.005 mfd. and one 0.025 mfd. capacitors in metal container	4.50
7526	Transformer—Audio input transformer	2.50
7527	Transformer—Audio transformer pack comprising interstage and output transformers in metal container	3.25
	CABINET ASSEMBLIES (Prices furnished upon request)	
6113	Felt—Cabinet felt foot—Package of 15	.50
7523	Escutcheon—Station selector escutcheon	.50
X118	Baffle board and grille cloth	
X146	Cabinet—Complete less equipment	
	REPRODUCER ASSEMBLIES	
2975	Rivet—Eyelet rivet for mounting cone—Package of 100	.50
6166	Board—Terminal board with two terminals—Package of 5	1.00
8702	Ring—Cone retaining ring	.50
8828	Bracket—Cone bracket and magnet assembly	4.60
8921	Cone—Reproducer cone complete with voice coil—Package of 5	6.00

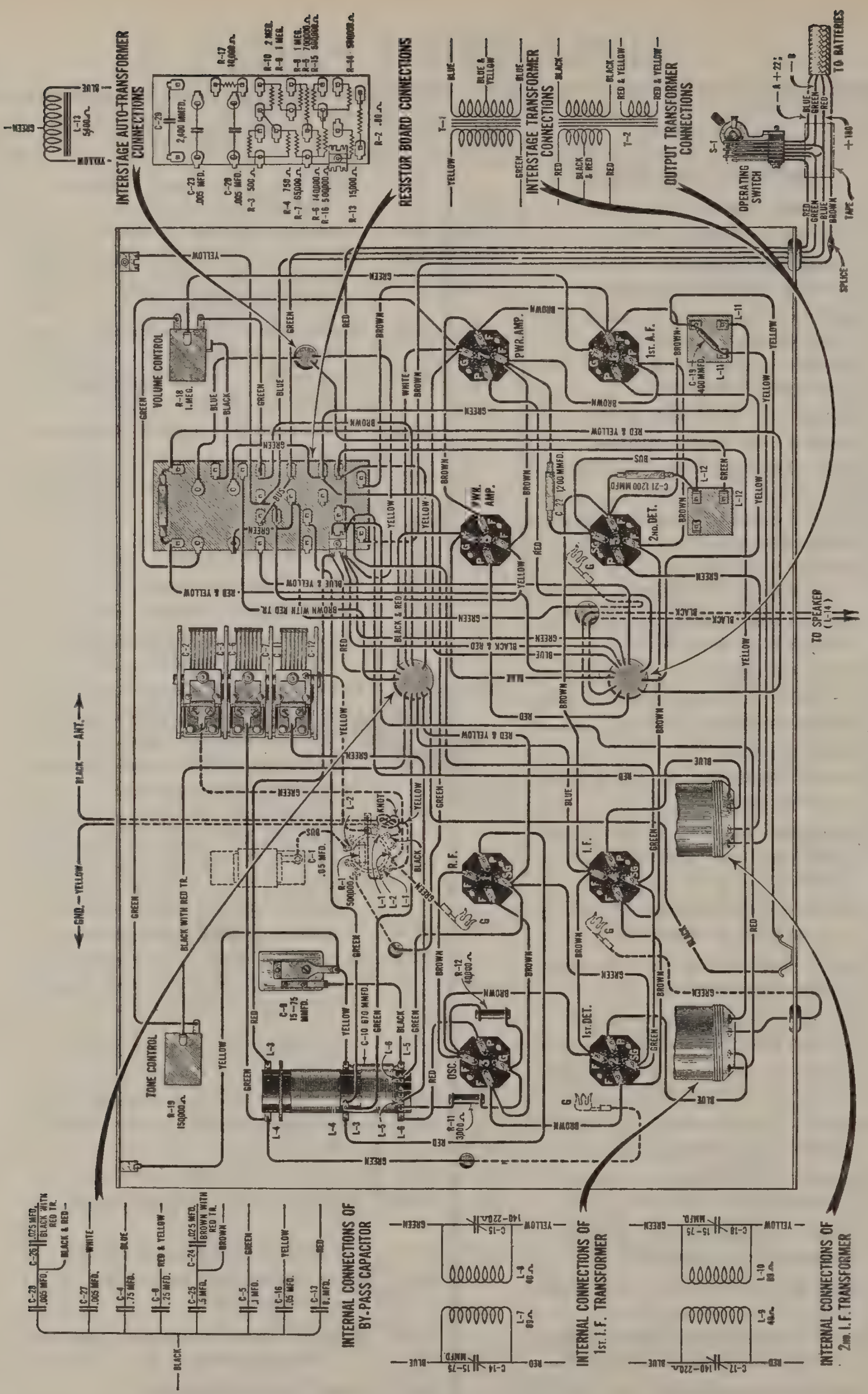


Figure 2—Chassis Wiring Diagram of R-71-B

SERVICE DIVISION

RCA Victor Company, Inc.

Camden, N. J., U. S. A.

Printed in U. S. A

Instructions for

RCA Victor R-73

Radiola

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron *only,* the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

External Connections—Figure 1 shows the external connections and recommended antenna system. It is essential that a good ground connection be provided. Make connections to the antenna and ground as illustrated. Then connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) for which the instrument is rated (see rating label on rear of receiver).

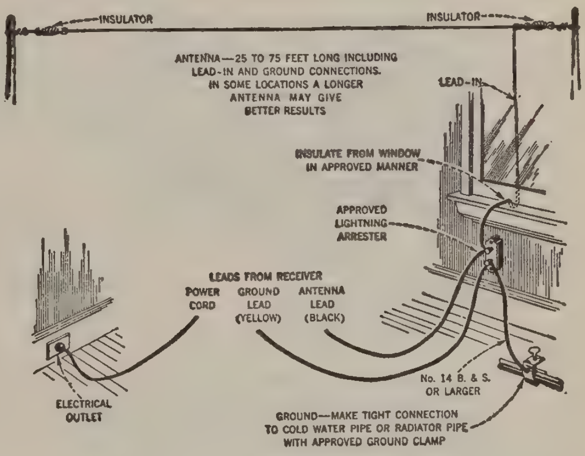

INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS. IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
APPROVED LIGHTNING ARRESTER
LEADS FROM RECEIVER
POWER CORD
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
No. 14 B. & S. OR LARGER
ELECTRICAL OUTLET
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

OPERATION

The operating controls are shown in Figure 2. Proceed as follows:

1. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

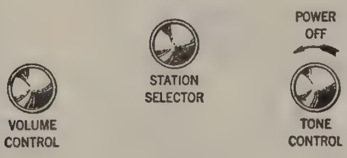


Figure 2

2. Advance the Volume Control about one quarter turn from the extreme counter-clockwise position and turn the Station Selector in either direction until a station is heard. (The dial scale is calibrated in kilocycles to facilitate selecting stations of known frequency.) If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

3. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

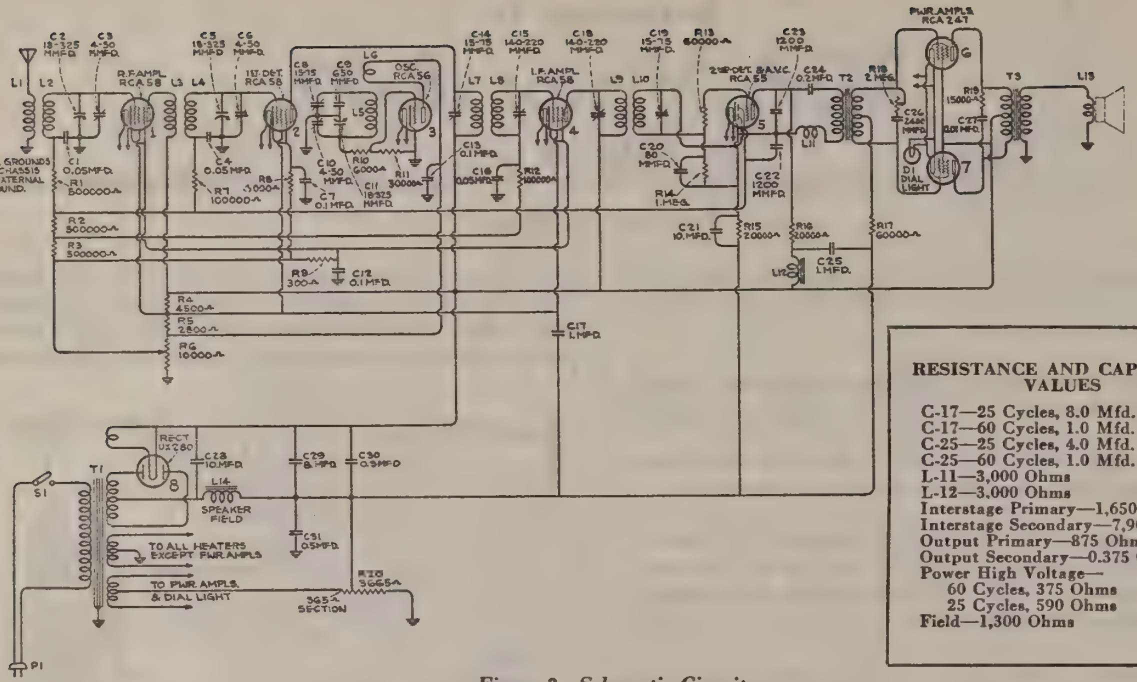
4. Adjust the Volume Control to secure the desired volume.

NOTE—The *automatic volume control* maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

5. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

6. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.



RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
  60 Cycles, 375 Ohms
  25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit

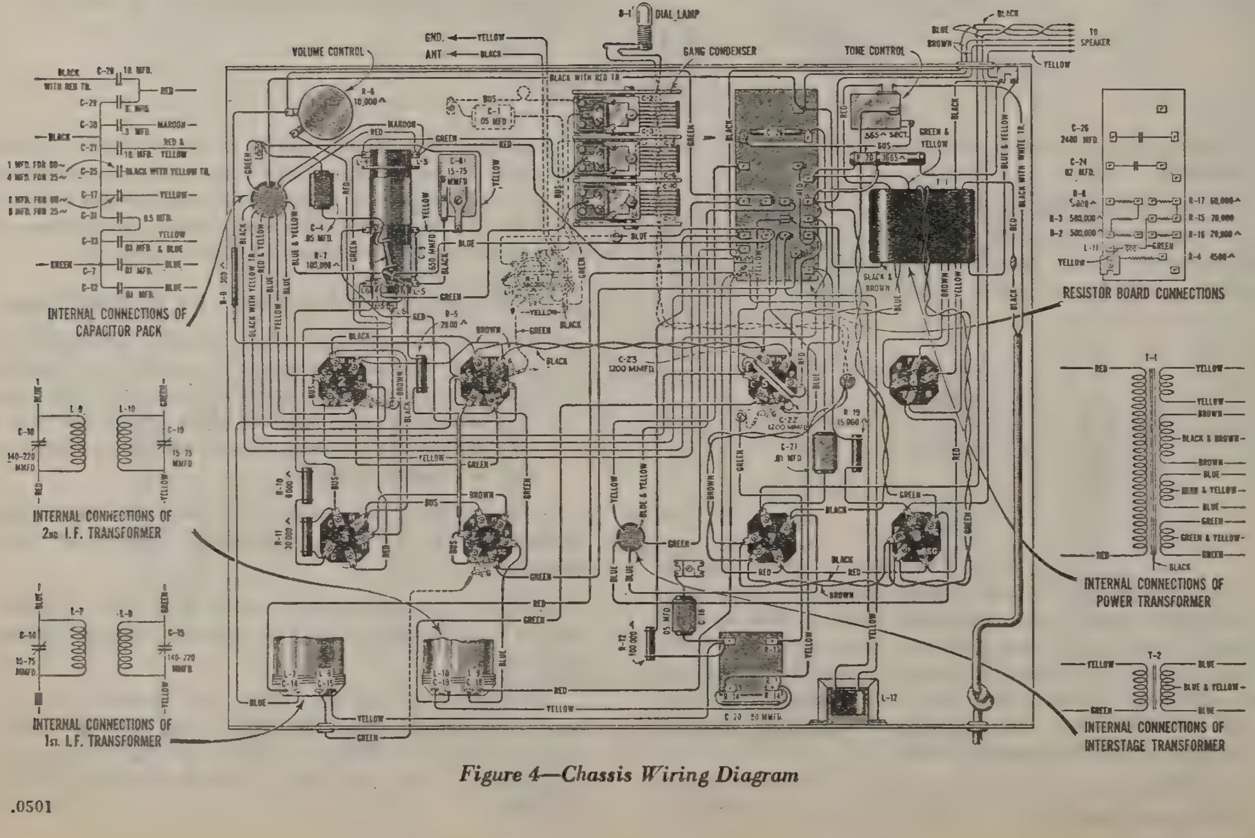

DIAL LAMP
GND.
ANT.
VOLUME CONTROL
GANG CONDENSER
TONE CONTROL
TO SPEAKER
INTERNAL CONNECTIONS OF CAPACITOR PACK
INTERNAL CONNECTIONS OF 2ND. I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 1ST. I.F. TRANSFORMER
RESISTOR BOARD CONNECTIONS
INTERNAL CONNECTIONS OF POWER TRANSFORMER
INTERNAL CONNECTIONS OF INTERSTAGE TRANSFORMER

Figure 4—Chassis Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Power Consumption	100 Watts
Type and Number of Radiotrons	3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit	Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output	3 Watts
R. F. and Oscillator Alignment Frequency	600 K. C. and 1400 K. C.
Intermediate Frequency	175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

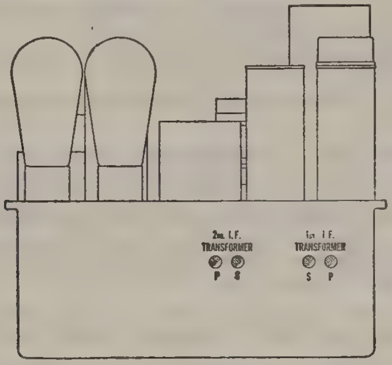


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

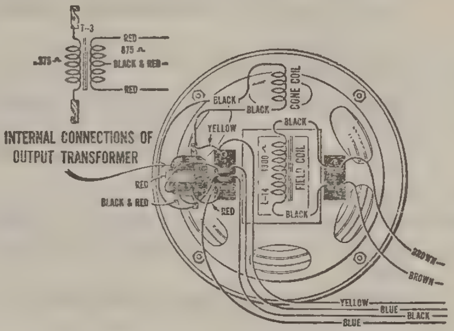


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles, A. C. Line—V. C. at Maximum and no Signal

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field	105 Volts
Chassis to Low Side of Field	90 Volts
Voltage Across Field	120 Volts
Rectifier	370 Volts R.M.S. Each Plate—80 M.A. Each Plate

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2746	Socket—Dial lamp socket	$0.20
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	.35
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3369	Resistor—4,500 ohms—Porcelain type—20 watts	.85
3437	Knob—Noise suppressor knob	.60
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor — Porcelain type — 3,665 ohms — Tapped at 365 ohms	.78
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.30
3468	Resistor—300 ohms—Flexible type—Pk. of 5	1.00
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6301	Reactor—Filter reactor	1.40
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6308	Coil—R. F. coil complete with mounting bracket	1.36
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer — Second intermediate frequency transformer	2.14
6369	Volume control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	$1.34
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	.50
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7510	Shield — Radiotron tube shield — Maroon finish	.30
7511	Shield—Radiotron tube shield top—Maroon finish	.25
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105–125 volts—50–60 cycles	6.40
7552	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	5.20
7556	Transformer—Power transformer—105–125 volts—25–50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24
7565	Shield—Radiotron tube shield top—Red	.25
7566	Shield—Radiotron tube shield—Red	.30
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.35
8935	Cone—Reproducer cone complete with voice coil—Package of 5	5.25
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32
	CABINET ASSEMBLIES	
6113	Foot—Cabinet felt foot—Package of 15	.50
7523	Escutcheon—Station selector escutcheon	.50
X181	Cabinet—Complete less equipment	
X182	Baffle board and grille cloth	

0510

RCA Victor Company, Inc.
Camden, N. J., U. S. A.

23113

Printed in U. S. A.

Instructions for
RCA Victor R-73-A

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron *only,* the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

External Connections—Figure 1 shows the external connections and recommended antenna system. It is essential that a good ground connection be provided. Make connections to the antenna and ground as illustrated. Then connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) for which the instrument is rated (see rating label on rear of receiver).

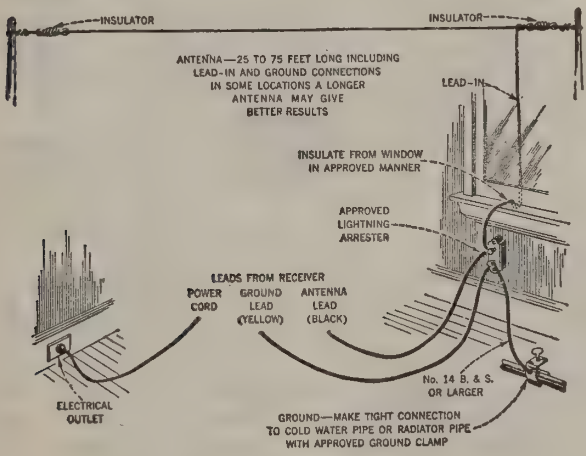

INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
APPROVED LIGHTNING ARRESTER
LEADS FROM RECEIVER
POWER CORD
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
No. 14 B. & S. OR LARGER
ELECTRICAL OUTLET
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

OPERATION

The operating controls on the front panel are shown in Figure 2. Proceed as follows:

1. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

2. Set the Volume Control to the extreme clockwise position and the Silent Tuning Control (located on left-hand side panel) to the extreme counter-clockwise position. Turn the Station Selector to a point, near mid range, at which no station is heard within several scale divisions. Next turn the Silent Tuning Control clockwise until background noise (static) is heard, then turn it slightly counter-clockwise until the noise just disappears.

NOTE—The adjustment just described provides quiet tuning, that is, suppression of background noise between station settings, and permits reception of all stations whose signals are above the existing noise level.

3. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

NOTE—Should no station be heard at any point on the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent Tuning Control clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

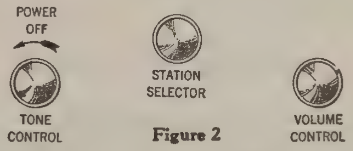


Figure 2

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

5. Adjust the Volume Control to secure the desired volume.

NOTE—The *automatic volume control* maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength may be received at approximately the same volume without readjustment of the Volume Control.

6. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference (when tuned to a station).

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

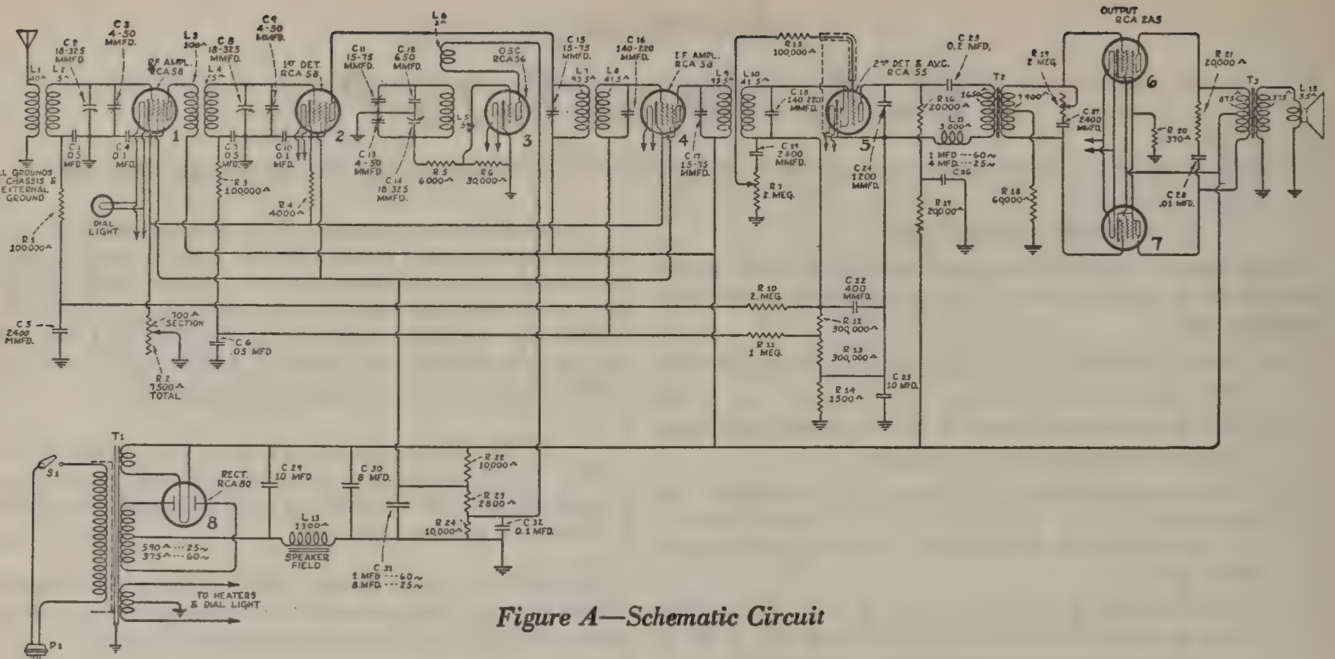


Figure A—Schematic Circuit

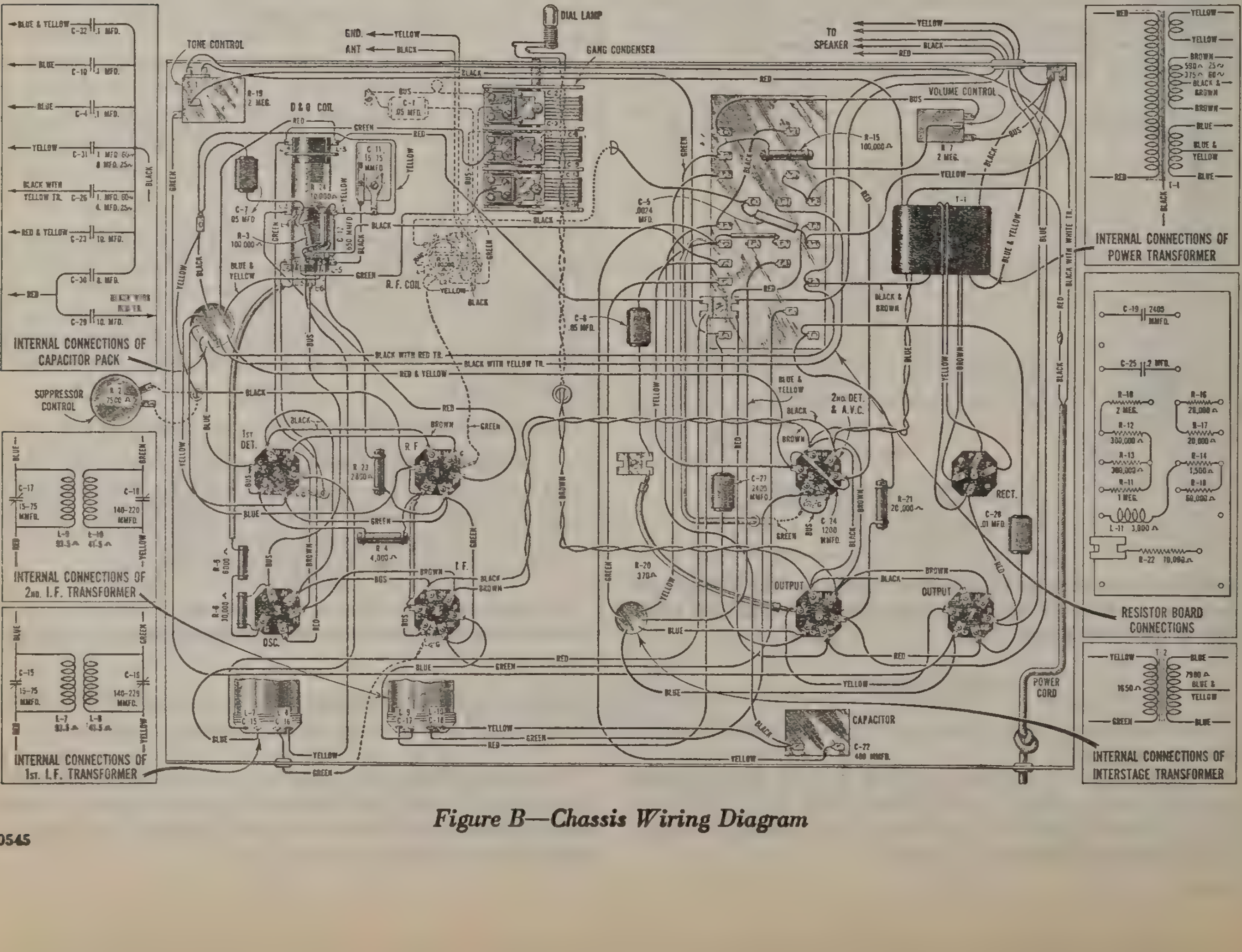

DIAL LAMP
GND. YELLOW
ANT BLACK
TONE CONTROL
GANG CONDENSER
TO SPEAKER
D & O COIL
R. F. COIL
VOLUME CONTROL
SUPPRESSOR CONTROL
1st DET.
R F
OSC.
I.F.
2nd DET. & A.V.C.
RECT.
OUTPUT
OUTPUT
CAPACITOR
POWER CORD
INTERNAL CONNECTIONS OF CAPACITOR PACK
INTERNAL CONNECTIONS OF 2nd I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 1st. I.F. TRANSFORMER
INTERNAL CONNECTIONS OF POWER TRANSFORMER
RESISTOR BOARD CONNECTIONS
INTERNAL CONNECTIONS OF INTERSTAGE TRANSFORMER

Figure B—Chassis Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating..........................105–125 Volts
Power Consumption..........................100 Watts
Type and Number of Radiotrons. .3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit. .Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output..........................3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C., and 1400 K. C.
Intermediate Frequency......................175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage, Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

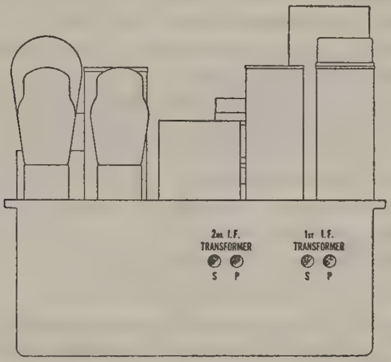


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

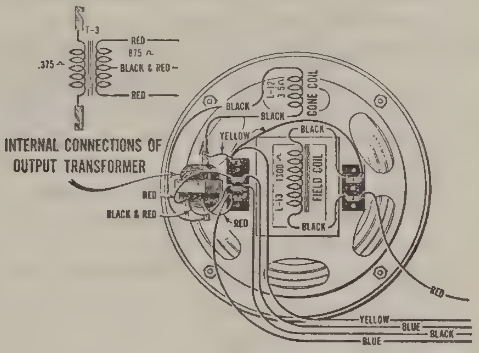


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles, A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det. RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4
Rectifier—370 Volts R.M.S. Each Plate					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3078	Resistor—10,000 ohms—½ watt—Carbon type—Package of 5	1.00
3241	Resistor—300,000 ohms—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd	.46
3451	Bracket—Dial lamp bracket and indicator... Package of 2	.38
3455	Capacitor—0.01 mfd	.44
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3460	Capacitor—1200 mmfd	.30
3472	Capacitor—0.0024 mfd	.32
3548	Knob—Noise suppressor knob	.24
3549	Capacitor—400 mmfd	.34
3550	Resistor—370 ohms—Flexible type—Package of 5	.80
3556	Capacitor—0.05 mfd	.34
3565	Socket—Dial lamp socket	.50
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6188	Resistor — 2 megohm — Carbon type — ½ watt—Package of 5	1.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.30
6250	Resistor — 4,000 ohms — Carbon type — ½ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang variabe tuning capacitor drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6312	Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6318	Resistor—10,000 ohms—Porcelain type—20 watt	.80
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	$0.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6370	Tone control—Complete with mounting nut	1.34
6452	Volume control—Complete with mounting nut	1.40
6453	Rheostat—Noise suppressor rheostat	1.10
6454	Coil—R. F. coil complete with mounting bracket	.90
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd	.50
7065	Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.20
7549	Transformer—Interstage audio transformer	2.48
7582	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	8.06
7583	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation	10.00
7584	Transformer—Power transformer 105–125 volts—50–60 cycles	5.72
7585	Transformer—Power transformer—105–125 volts—25–50 cycles	9.86
7586	Transformer—Power transformer 200–250 volts—50–60 cycles	5.88
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets	.50
6184	Board—Terminal board complete with 3 terminals	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone complete with voice coil	6.35
9421	Coil assembly—Comprising field coil, magnet, and cone support	4.32

.0556

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23154

Printed in U. S. A.

Instructions for
RCA Victor R-75
Radiola

INSTALLATION

Preliminary—After unpacking the instrument, remove the unfinished wood shipping strip fastened across the rear of the receiver chassis. Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

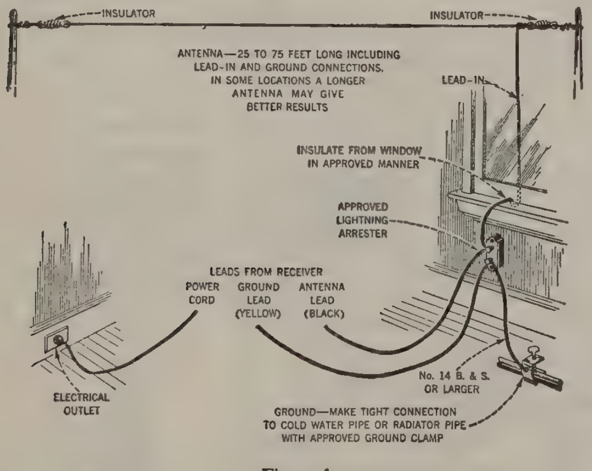
(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron *only,* the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

External Connections—Figure 1 shows the external connections and recommended antenna system. It is essential that a good ground connection be provided. Make connections to the antenna and ground as illustrated. Then connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) for which the instrument is rated (see rating label on rear of receiver).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ELECTRICAL OUTLET
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

OPERATION

The operating controls are shown in Figure 2. Proceed as follows:

1. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

2. Set both the Volume Control and the Silent Tuning Control to the extreme clockwise position. Turn the Station Selector to a point, near mid range, at which no station is heard within several scale divisions. Next turn the Silent Tuning Control counter-clockwise until background noise (static) is heard, then turn it slightly clockwise until the noise just disappears.

NOTE—The adjustment just described provides quiet tuning, that is, suppression of background noise between station settings, and permits reception of all stations whose signals are above the existing noise level.

3. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

NOTE—Should no station be heard at any point on the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent Tuning Control counter-clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

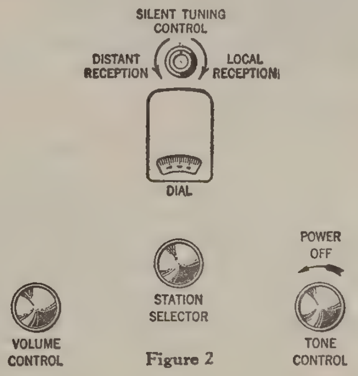

Figure 2

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

5. Adjust the Volume Control to secure the desired volume.

NOTE—The *automatic volume control* maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength may be received at approximately the same volume without readjustment of the Volume Control.

6. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference (when tuned to a station).

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

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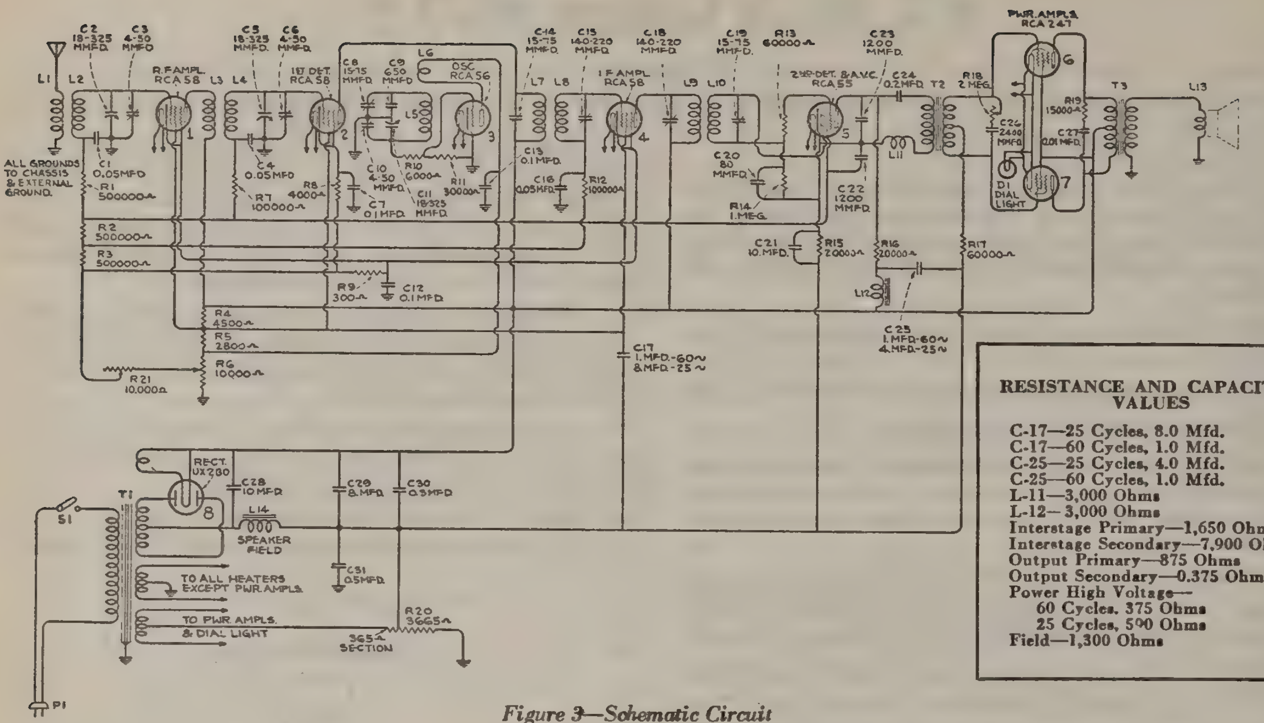


RESISTANCE AND CAPACITOR VALUES

C-17—25 Cycles, 8.0 Mfd.
C-17—60 Cycles, 1.0 Mfd.
C-25—25 Cycles, 4.0 Mfd.
C-25—60 Cycles, 1.0 Mfd.
L-11—3,000 Ohms
L-12—3,000 Ohms
Interstage Primary—1,650 Ohms
Interstage Secondary—7,900 Ohms
Output Primary—875 Ohms
Output Secondary—0.375 Ohm
Power High Voltage—
    60 Cycles, 375 Ohms
    25 Cycles, 590 Ohms
Field—1,300 Ohms

Figure 3—Schematic Circuit

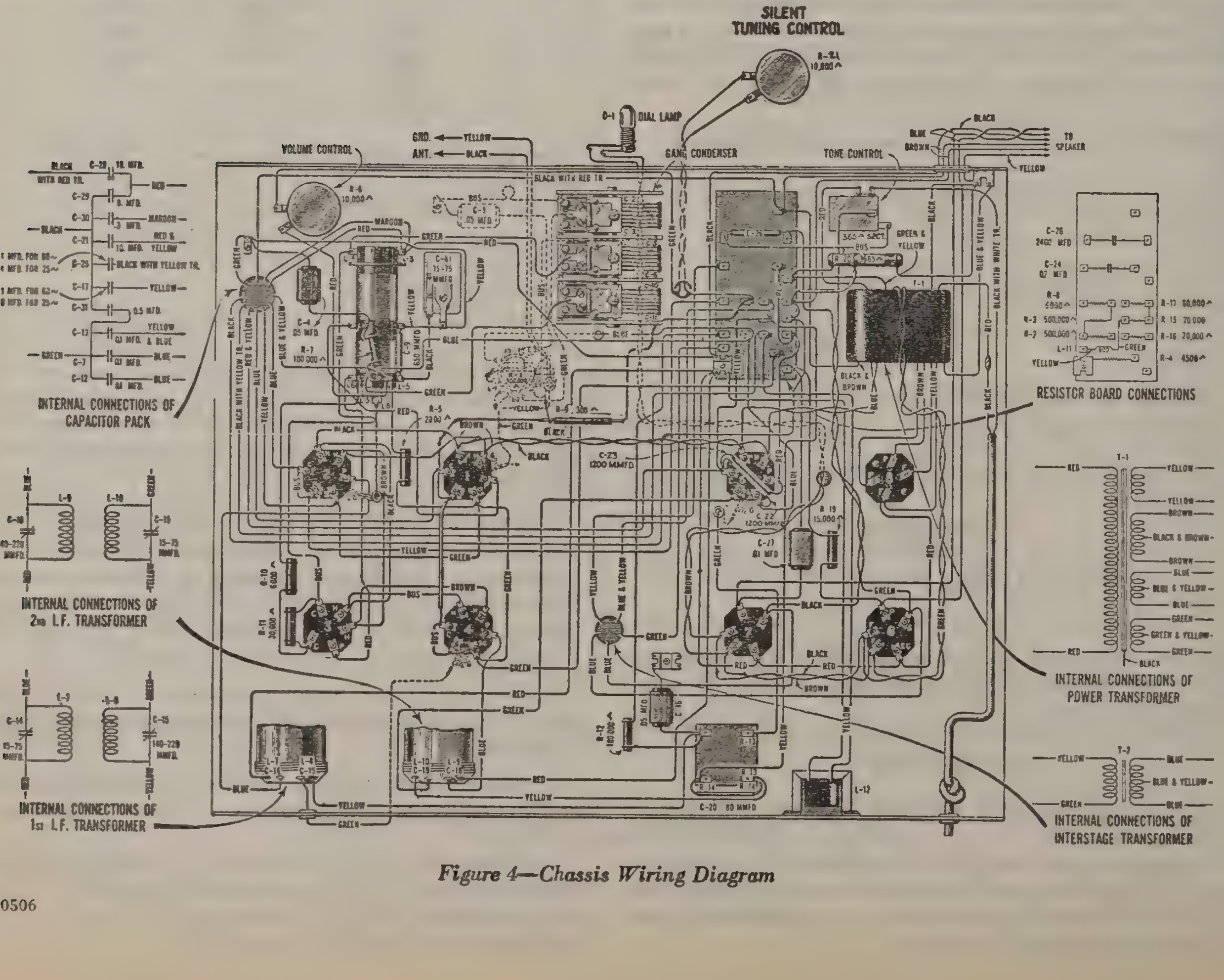


Figure 4—Chassis Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating . . . . 105–125 Volts
Power Consumption . . . . 100 Watts
Type and Number of Radiotrons . . . . . . 3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit . . . . Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output . . . . 3 Watts
R. F. and Oscillator Alignment Frequency 600 K. C. and 1400 K. C.
Intermediate Frequency . . . . 175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Push-Pull Pentode Output. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

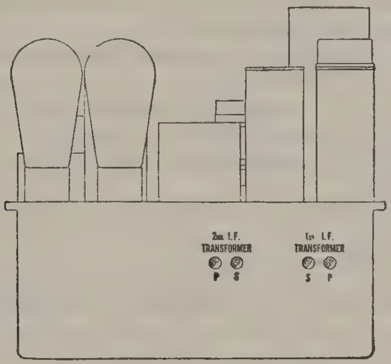


Figure 5—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure 5 for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

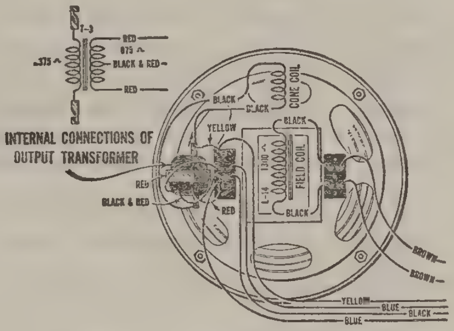


Figure 6—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles, A. C. Line—V. C. at Maximum and no Signal

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field . 105 Volts
Chassis to Low Side of Field . . . . 90 Volts
Voltage Across Field . . . . 120 Volts
Rectifier . . 370 Volts R.M.S. Each Plate—80 M.A. Each Plate

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2746	Socket—Dial lamp socket	$0.20
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	.35
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3369	Resistor—4,500 ohms—Porcelain type—20 watts	.85
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor — Porcelain type — 3,665 ohms — Tapped at 365 ohms	.78
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.30
3468	Resistor—300 ohms—Flexible type—Pk. of 5	1.00
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6192	Spring—3-gang tuning capacitor drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3-gang variable tuning capacitor drive cord—Package of 5	.60
6300	Socket—4-contact Radiotron socket	.35
6301	Reactor—Filter reactor	1.40
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6308	Coil—R. F. coil complete with mounting bracket	1.36
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer — Second intermediate frequency transformer	$2.14
6369	Volume or noise suppressor control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	1.34
7054	Cord—Power cord	1.00
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	.50
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7510	Shield — Radiotron tube shield — Maroon finish	.30
7511	Shield—Radiotron tube shield top—Maroon finish	.25
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105–125 volts—50–60 cycles	6.40
7501	Capacitor—3-gang variable tuning capacitor complete with mounting screws and washers	4.20
7556	Transformer—Power transformer—105–125 volts—25–50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24
7565	Shield—Radiotron tube shield top—Red	.25
7566	Shield—Radiotron tube shield—Red	.30
7577	Transformer—Power transformer—220 volts—50–60 cycles	7.66
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.35
8935	Cone—Reproducer cone complete with voice coil—Package of 5	5.25
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32

.0501-c (3-3)

RCA Victor Company, Inc.

CAMDEN, NEW JERSEY, U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor R-75-A

INSTALLATION

Preliminary—After unpacking the instrument, remove the unfinished wood shipping strip fastened across the rear of the receiver chassis. Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron *only,* the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

External Connections—Figure 1 shows the external connections and recommended antenna system. It is essential that a good ground connection be provided. Make connections to the antenna and ground as illustrated. Then connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) for which the instrument is rated (see rating label on rear of receiver).

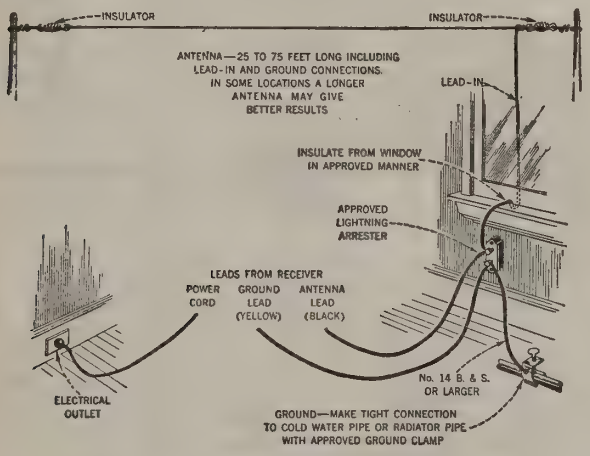

INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS. IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
APPROVED LIGHTNING ARRESTER
LEADS FROM RECEIVER
POWER CORD
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
ELECTRICAL OUTLET
No. 14 B. & S. OR LARGER
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

OPERATION

The operating controls are shown in Figure 2. Proceed as follows:

1. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

2. Set the Volume Control to the extreme clockwise position and the Silent Tuning Control to the extreme counter-clockwise position. Turn the Station Selector to a point, near mid range, at which no station is heard within several scale divisions. Next turn the Silent Tuning Control clockwise until background noise (static) is heard, then turn it slightly counter-clockwise until the noise just disappears.

NOTE—The adjustment just described provides quiet tuning, that is, suppression of background noise between station settings, and permits reception of all stations whose signals are above the existing noise level.

3. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

NOTE—Should no station be heard at any point on the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent Tuning Control clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

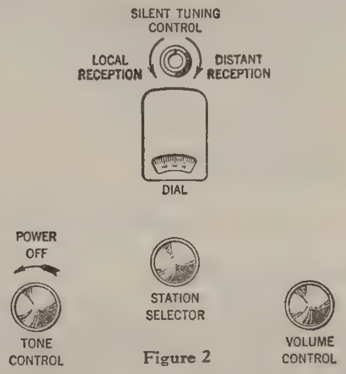


Figure 2

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

5. Adjust the Volume Control to secure the desired volume.

NOTE—The *automatic volume control* maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength may be received at approximately the same volume without readjustment of the Volume Control.

6. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference (when tuned to a station).

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

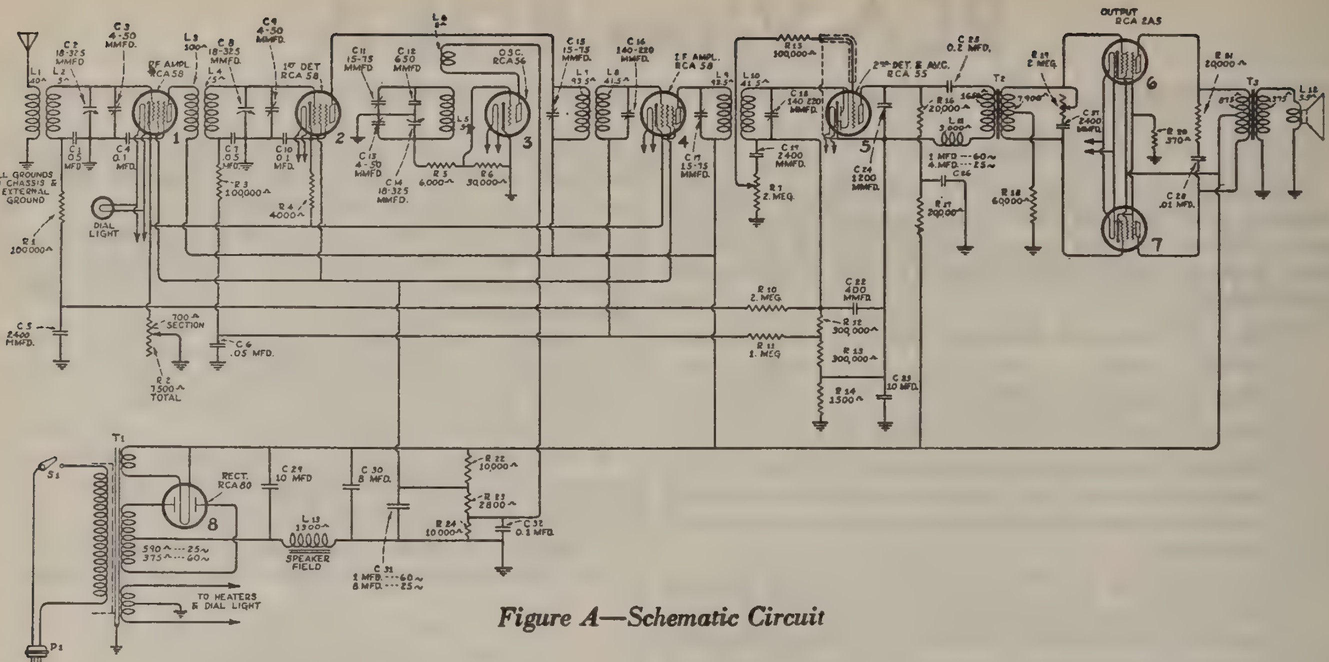


Figure A—Schematic Circuit

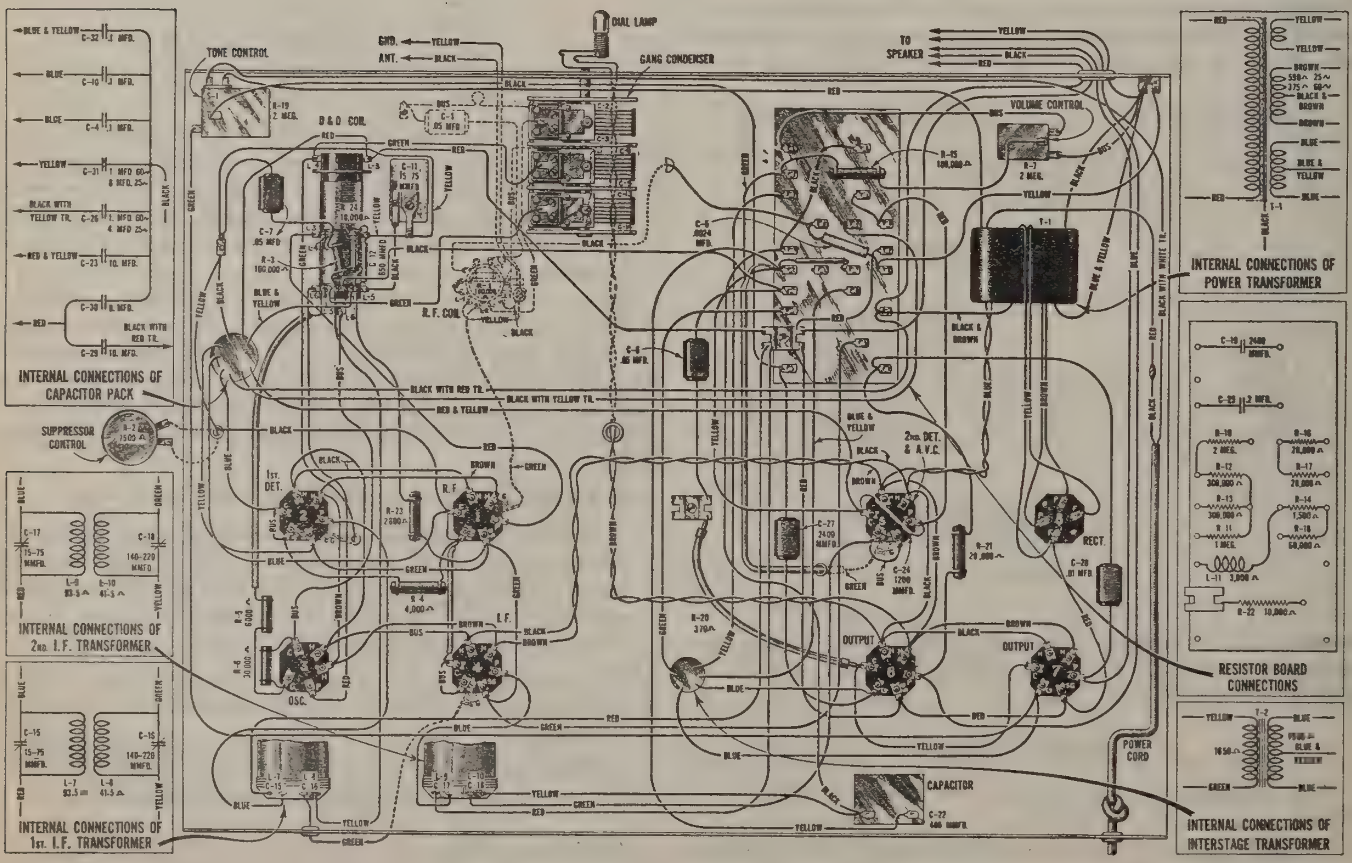


Figure B—Chassis Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Power Consumption	100 Watts
Type and Number of Radiotrons	3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-2A5, 1 UX-280—Total, 8
Type of Circuit	Super-Heterodyne with A.V.C., tone control and push-pull Universal Output Tubes
Undistorted Output	3 Watts
R. F. and Oscillator Alignment Frequency	600 K. C., and 1400 K. C.
Intermediate Frequency	175 K. C.

This receiver is an eight tube Super-Heterodyne incorporating Automatic volume control, tone control and Universal Output tubes operated as a push-pull pentode stage. Service Data will be found to be similar to that of other Super-Heterodyne receivers incorporating similar features.

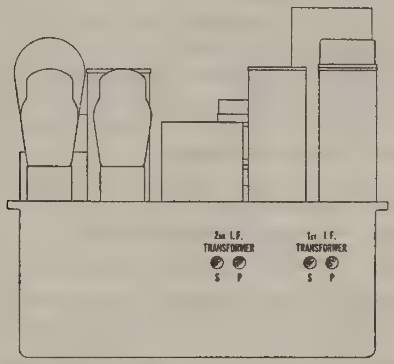


Figure C—I. F. Alignment Location

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C., and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screwdriver such as Stock No. 7065 and an output meter.

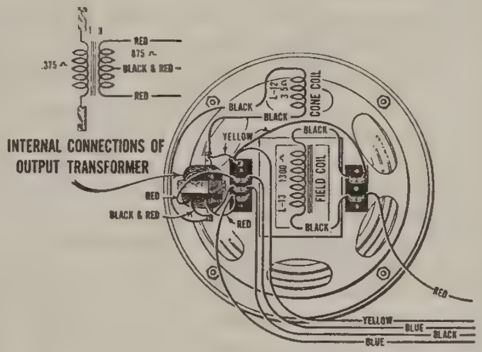


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors, accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles, A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Cathode, Volts	Screen Grid to Filament or Cathode, Volts	Plate to Filament or Cathode, Volts	Plate Current, M. A.	Heater or Filament, Volts
1. R. F. RCA-58	4.0	100	240	6.0	2.4
2. 1st Det. RCA-58	10.0	90	230	2.0	2.4
3. Osc. RCA-56	—	—	75	4.5	2.4
4. I. F. RCA-58	4.0	100	240	6.0	2.4
5. 2nd Det. RCA-55 and A.V.C.	5.8	—	100	4.0	2.4
6. PWR. RCA-2A5	19.0	230	220	20.0	2.4
7. PWR. RCA-2A5	19.0	230	220	20.0	2.4
Rectifier—370 Volts R.M.S. Each Plate					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3078	Resistor—10,000 ohms—½ watt—Carbon type—Package of 5	1.00
3241	Resistor—300,000 ohms—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd	.46
3451	Bracket—Dial lamp bracket and indicator... Package of 2	.38
3455	Capacitor—0.01 mfd	.44
3458	Resistor — 2,800 ohms — Carbon type — ½ watt—Package of 5	1.00
3460	Capacitor—1200 mmfd	.30
3472	Capacitor—0.0024 mfd	.32
3548	Knob—Noise suppressor knob	.24
3549	Capacitor—400 mmfd	.34
3550	Resistor—370 ohms—Flexible type—Package of 5	.80
3556	Capacitor—0.05 mfd	.34
3565	Socket—Dial lamp socket	.50
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6188	Resistor — 2 megohm — Carbon type — ½ watt—Package of 5	1.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.30
6250	Resistor — 4,000 ohms — Carbon type — ½ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang variabe tuning capacitor drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6312	Capacitor—650 mmfd.—Located on detector oscillator coil—Package of 5	1.50
6318	Resistor—10,000 ohms—Porcelain type—20 watt	.80
6323	Shaft—Tuning condenser drive shaft with one flat washer and 2 "C" washers—Package of 2	$0.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6370	Tone control—Complete with mounting nut	1.34
6452	Volume control—Complete with mounting nut	1.40
6453	Rheostat—Noise suppressor rheostat	1.10
6454	Coil—R. F. coil complete with mounting bracket	.90
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd	.50
7065	Screw driver—Micarta screw driver for I. F., R. F., and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.20
7549	Transformer—Interstage audio transformer	2.48
7582	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., two 1.0 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	8.06
7583	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 4.0 mfd., capacitors in metal container—For 25 cycle operation	10.00
7584	Transformer—Power transformer 105–125 volts—50–60 cycles	5.72
7585	Transformer—Power transformer—105–125 volts—25–50 cycles	9.86
7586	Transformer—Power transformer 200–250 volts—50–60 cycles	5.88
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets	.50
6184	Board—Terminal board complete with 3 terminals	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone complete with voice coil	6.35
9421	Coil assembly—Comprising field coil, magnet, and cone support	4.32

.0556

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23158

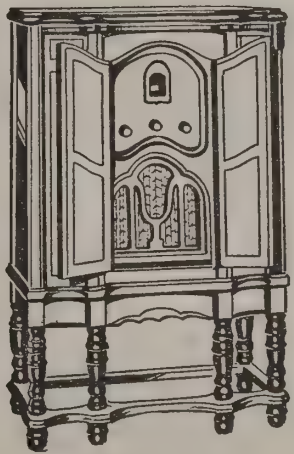
Printed in U. S. A.

RCA Victor

Bi-Acoustic Super-Heterodyne

Model R-78

SERVICE NOTES



RCA Victor R-78

[Fourth Edition—1M
September, 1933]

SERVICE DIVISION

RCA Victor Company, Inc.

Camden, N. J., U. S. A.

A RADIO CORPORATION OF AMERICA SUBSIDIARY

REPRESENTATIVES IN PRINCIPAL CITIES

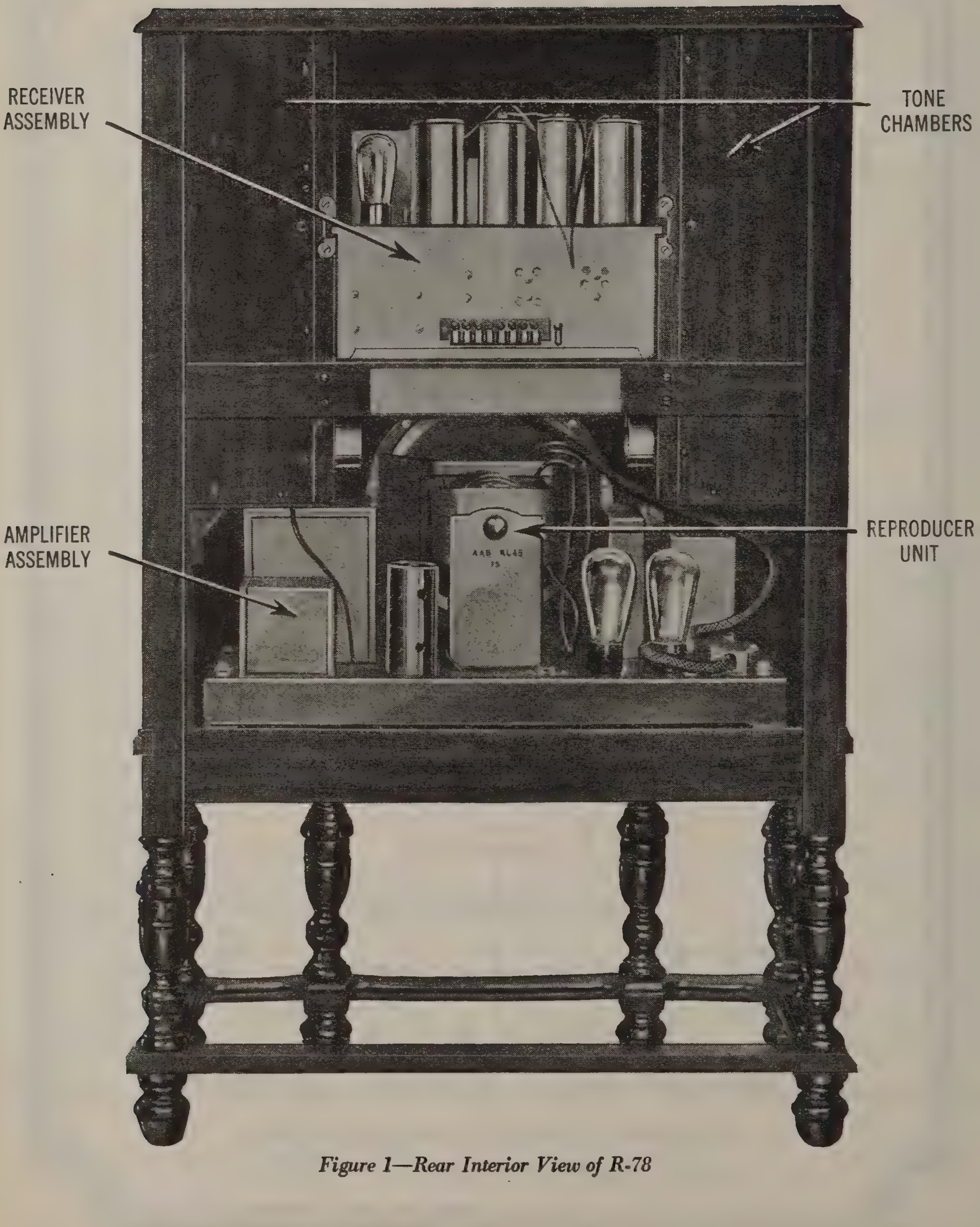


Figure 1—Rear Interior View of R-78

RCA Victor R-78

(Bi-Acoustic Super-Heterodyne)

SERVICE NOTES

(The following data applies to models without noise suppressor)

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	50–60 Cycles
Power Consumption	110 Watts Average
(The input wattage may vary from 70 to 130 watts depending on the output volume being used)	
Recommended Antenna Length	25–100 Feet
Type of Circuit	Super-Heterodyne with A.V.C., Compensated A.F. system and Class "B" output stage
Type and number of Radiotrons	4 RCA-58, 5 RCA-56, 2 RCA-46, and 1 RCA-82, Total 12
Number of R. F. Stages	One
Type of first detector	Exponential with control grid voltage varied by A.V.C. tube
Number of Intermediate Stages	Two, one for signal and one for A.V.C.
Type of Second Detector	Power Grid Bias
Number of A. F. Stages	Two, one Push-Pull driver and one Class "B" output
Type of tone control	Reactor capacitor and variable resistor for reducing high frequency response
Type of Rectifier	Mercury vapor full wave RCA-82
Undistorted output	Approximately 20 watts Maximum

PHYSICAL SPECIFICATIONS

Height	43 inches
Width	28¼ inches
Depth	14 inches
Weight Packed for Shipment	168 Lbs.

The RCA Victor R-78 is a 12-tube Bi-Acoustic Super-Heterodyne Radio Receiver incorporating all the usual Super-Heterodyne features, together with the New RCA Victor Automatic Volume Control, Compensated Audio System and Class "B" output amplifier. These features, mainly evidenced by the greatly improved tone quality and high output, give the R-78 a degree of performance not obtainable with any existing type of Radio Receiver.

In order to economically build the R-78 several new types of Radiotrons have been produced. These are namely the RCA-58, a new R. F. Amplifier Pentode, the RCA-56, a high efficiency general purpose tube similar to the UY-227, the RCA-46, a new output tube designed for Class "B" operation and the RCA-82, a new mercury vapor rectifier Radiotron giving the degree of voltage regulation necessary for a Class "B' Amplifier.

A brief technical description of this remarkable new receiver follows. Figure 2 shows the schematic wiring diagram.

In order to understand the reasons for many of the design features of the R-78 it is necessary to first review some of the requirements of a radio receiver. These may be listed in the following order:

Sensitivity. The primary requirement for any Radio receiver is its ability to bring in a station. The R-78 has sensitivity that reaches into the noise level even in a quiet location.

Selectivity. The ability of a receiver to separate stations even on adjacent channels is that quality known as selectivity. The R-78 has the ability to separate stations on adjacent channels even though one is a local station. In addition, the Automatic Volume Control is so designed that it does not tend to spread the band of any particular station due to its action.

Fidelity. Fidelity is that quality of a radio receiver that determines how exact the reproduced sound follows that produced in the broadcasting studio, of course, excepting any distortion that may originate in the transmitting station. Fidelity must cover every quality of a set from input to sound pressure output. Not only must the receiver and amplifier be considered but also the loudspeaker and cabinet, the latter being very important. Fidelity also includes distortion that occurs at reduced volume due to certain characteristics of the human ear. These will be discussed later.

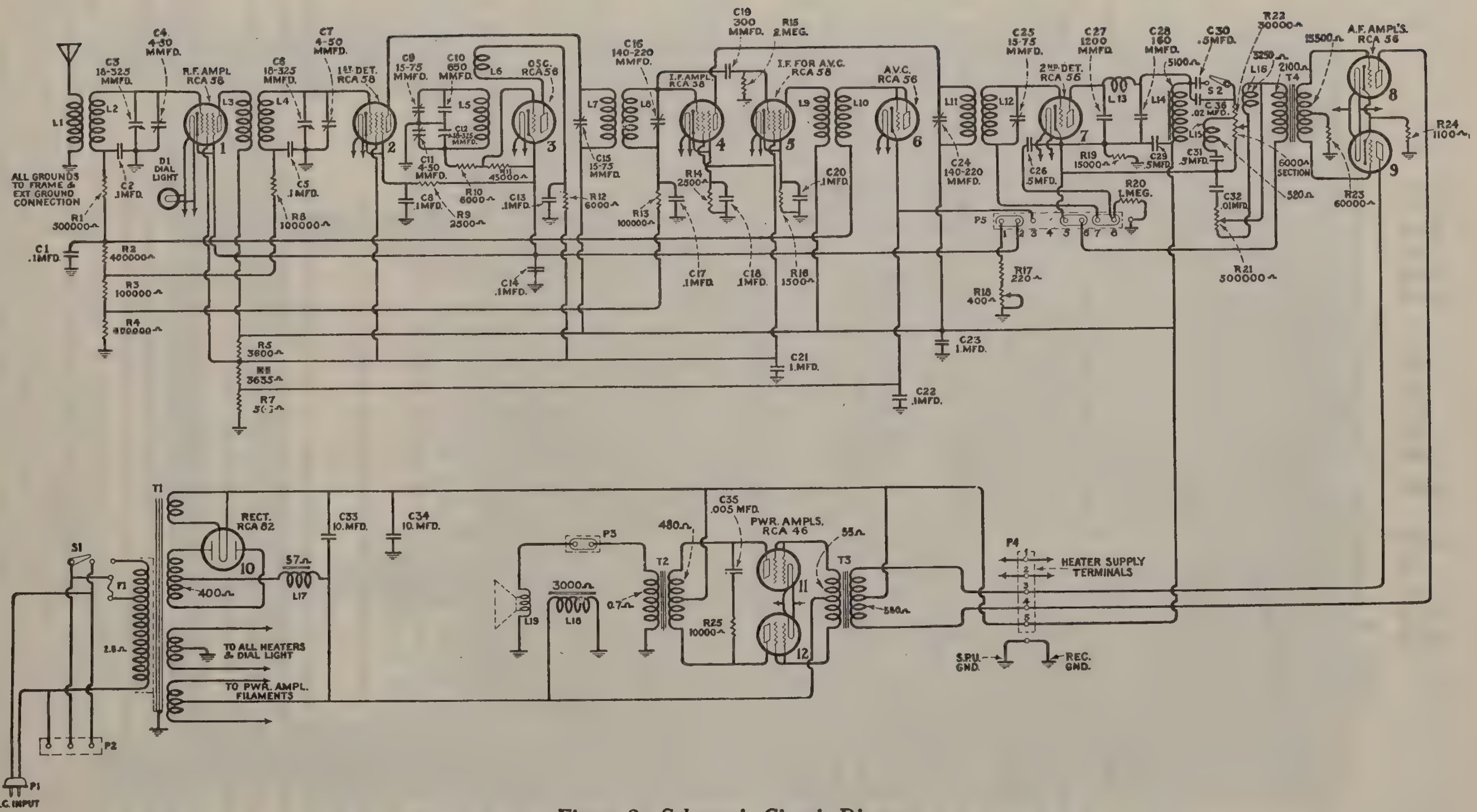


Figure 2—Schematic Circuit Diagram

The Automatic Volume Control used in the new R-78 has a very definite relation to sensitivity and selectivity. It is of the two element (diode) type and has a special I. F. stage to drive it. This volume control is many times more effective than any existing type. Due to its action the R. F. voltage applied to the Second Detector is substantially constant, for a signal of from 100 microvolts input to that of several volts. Such regulation, in addition to being desirable from an entertainment viewpoint, is also essential in this receiver due to the location of the volume control. Since there is no danger of overload on the detector grid the volume control may therefore be located in the audio circuit.

Referring to the schematic circuit, Figure 2, it will be noted that the A.V.C. functions in the following manner:

The input signal voltage for the I.F. Amplifier is applied also to the A.V.C. amplifier tube due to the grids of both being coupled together by means of the 300 mmfd. capacitor C-19. The output of the I.F. amplifier is applied to the Second Detector through a sharply tuned transformer. However, the output of the A.V.C. amplifier is coupled to the A.V.C. tube through a broadly tuned transformer. The reason for the location of the A.V.C. and coupling it in this manner is due to two reasons. First, too much selectivity ahead of the A.V.C. is not desirable as it introduces excessive distortion and overload as a station is tuned in. However, a certain amount of selectivity is essential, otherwise the A.V.C. will be caused to function by a local station when it is desired to tune in a weaker station on an adjacent channel. It will be noted that the grid and plate of the A.V.C. tube are tied together. This gives a straight rectifier action and the drop across Resistors R-2, R-3, and R-4 gives the bias for the R.F. Stage. The drop across R-3 and R-4 comprises the grid voltage for the First Detector, and that across R-4, the grid voltage for the I. F. Amplifier. As the drop in these Resistors is due to the signal voltage applied to the A.V.C. tube and this voltage is in turn dependent on the bias of the R.F., 1st Detector and I.F. Amplifier, an automatic action is obtained. The reason for the greater voltage applied to the R.F. stage and first detector than that applied to the I.F. is to prevent overloading of these tubes on the side of a strong carrier.

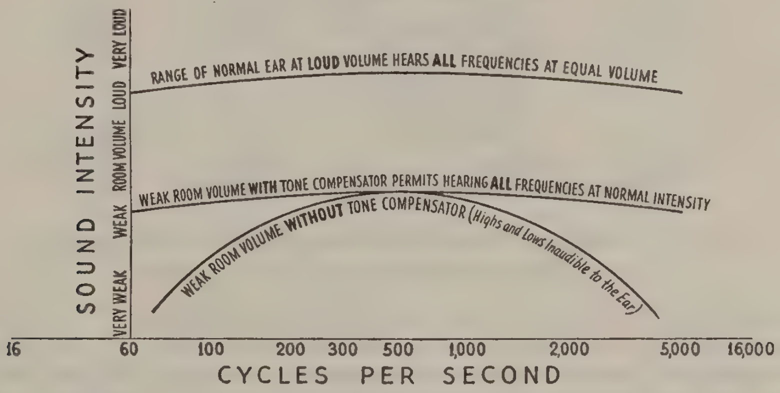


Figure 3—Graph Showing Compensation Used in R-78

We may now bring our attention to the audio stage and manual volume control. Both of these features are of entirely new design. However, before discussing them it is well to review a few of the requirements of a receiver that is to have good quality. First, the receiver must have good fidelity. That is, it must be capable of reproducing the very low notes as well as the high ones. The R-78 covers the range from approximately 35 cycles to 5000 cycles. Second, the receiver must have a large undistorted output, otherwise signals of high amplitude will overload the output stage. The R-78 has between ten and twenty watts undistorted output, the exact maximum depending on the percentage of modulation of the incoming signal. Third, the fidelity of the receiver must be changed with different settings of the volume control to compensate for the sensitivity of the ear in relation to different frequencies at various intensities. The ear is far less sensitive to both low and high frequencies at low degrees of volume than it is to the middle register. The R-78 volume control tends to bring up the low and high frequency response in relation to the middle frequencies as the volume is reduced. This greatly improves the quality of output at a room volume. The manner in which this is done follows:

The output of the second detector is coupled to the grid circuit of the driver stage by means of impedance-transformer coupling. The plate supply to the detector is fed through the coupling reactor L-14 and the audio component passes through the 0.5 mfd. coupling capacitor C-30 and the .02 mfd. capacitor C-36. The volume control is located between these stages and functions to reduce the voltage applied to the primary of the interstage transformer. It will be noted that the first section of the volume control is 30,000 ohms and at this point a trap circuit consisting of reactor L-15 and capacitor C-31 are directly in the output circuit of the detector.

The trap circuit tunes to approximately the middle of the audio response range and causes greater attenuation of the middle register than at either end as the volume is reduced. The effect as this point is reached is to reduce the general volume level but the middle register a greater amount than at the low and high ends. From this point to the minimum position the volume control acts as a potentiometer across the trap circuit and reduces the volume without changing the response to any greater degree. One has but to use this volume control to appreciate its great advance over existing types. Figure 3 gives an illustration of the manner in which this compensation is made.

The foregoing description applies only to one section of the volume control. Actually there are two sections, the other being between the R.F. and 1st detector cathodes and varying the overall sensitivity. This control prevents all noises and signals of a very weak character from being received and only functions over last 20° of the angular movement of the volume control. However, if such signals are desired, it is only necessary to advance the volume control in the usual manner to its maximum position.

It will be noted that the value of the coupling capacitors in the circuit varies, depending on the position of the switch S-2. The purpose of this switch is to decrease the low frequency output when receiving stations that have carrier waves with an excessive hum component. Also a certain amount of low frequency growl due to heterodyning of stations may be eliminated by this switch.

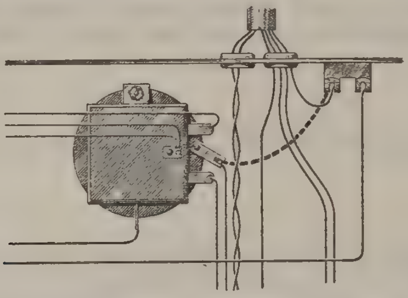


Figure 4—Wiring Change for Altering Volume Control Action
(Dotted Line Indicates Position of New Wire)

Two Radiotrons RCA-56 act as a driver stage for the output Class "B" Amplifier. In order to properly understand it, let us review the general principles of the Class "B" Amplifier.

There are two general types of audio amplifiers, namely, the Class "A" and the Class "B." Up to the present practically all modern radio receivers use the Class "A" Amplifier either in single or in a push-pull connection. In the Class "A" Amplifier the grid bias is so adjusted that either a positive or a negative voltage impressed on the grid will cause an equal increase or decrease in the normal plate current flowing. This increase and decrease is but a fraction of the total plate current and is the only useful part of it. Therefore, the major portion of plate circuit is entirely of a wasted nature.

In the Class "B" Amplifier, the grid bias is so adjusted that very little plate current is flowing, it virtually being biased to cut-off. As the grid swings negative there is very little reduction possible, so that the practical effect is nil. However, as the grid swings positive the plate current increases tremendously and this is entirely of an A.C. character, there being no residual current. Due to the use of two tubes both sides of the cycle are taken care of, first by one tube and then by the other. This gives an output greatly in excess of the Class "A" Amplifier because less energy is dissipated as losses in the tube and not appearing as useful output. The R-78 uses the new dual grid output tube RCA-46 in which the grids are tied together, which in effect acts as a high bias, resulting in plate current cut-off even though the tubes are operated at zero bias. Due to the grids only functioning on the positive half of the cycle considerable grid current flows on the positive half signal waves and a low impedance input circuit is necessary. The transformer between the driver stage and the power stage is therefore a step-down transformer with a low resistance secondary. The limit of power output is determined by the point at which the driver stage overloads. On a highly modulated signal, the maximum undistorted output may exceed 20 watts.

From the above description it is obvious that the load on the plate supply system will be highly variable. In order to provide suitable regulation for such a load the new mercury rectifier RCA-82 has been provided. The internal drop in this tube remains constant for practically all loads. The output current peaks therefore have no appreciable effect on the output voltage.

The loudspeaker has been designed to handle the increased power output and is designed to have increased frequency range.

The cabinet has two sound chambers that nullify the effects of cabinet resonance. These chambers have closer coupling to the loudspeaker than was previously obtained on Tone Equalizer Models through the use of Acoustic Orifices which also permit a sharper tuning of the chambers. (Acoustic Orifices are the small openings at the lower end of the chamber.) This, together with the large baffle area of the cabinet, gives the loudspeaker and amplifier full expression to their high quality output.

SERVICE DATA

(1) HUM AND NOISE

It is very important that a good ground always be connected to the yellow lead of the Receiver Chassis. Unless this is done excessive hum and noise will be obtained, even at low volume, from the RCA-82. Also lack of a good twist in the volume control leads will cause an undue amount of hum due to the pickup by the tone control reactor.

If an excessive amount of noise is still encountered it is evident that a good ground cannot be obtained. Under such conditions, connecting two .05 (1400 volt) capacitors from each RCA-82 plate to the filament connection that is also + B will remedy this condition.

(2) CHANGE IN RECEIVER ASSEMBLY FOR LOW INTENSITY STATIONS

The Automatic Volume Control used in the new R-78 has a very definite relation to sensitivity on signals in excess of 100 microvolts. In the vast majority of locations this action is entirely satisfactory, as stations rarely drop below this value. Having it work at a low value would greatly increase the noise between stations.

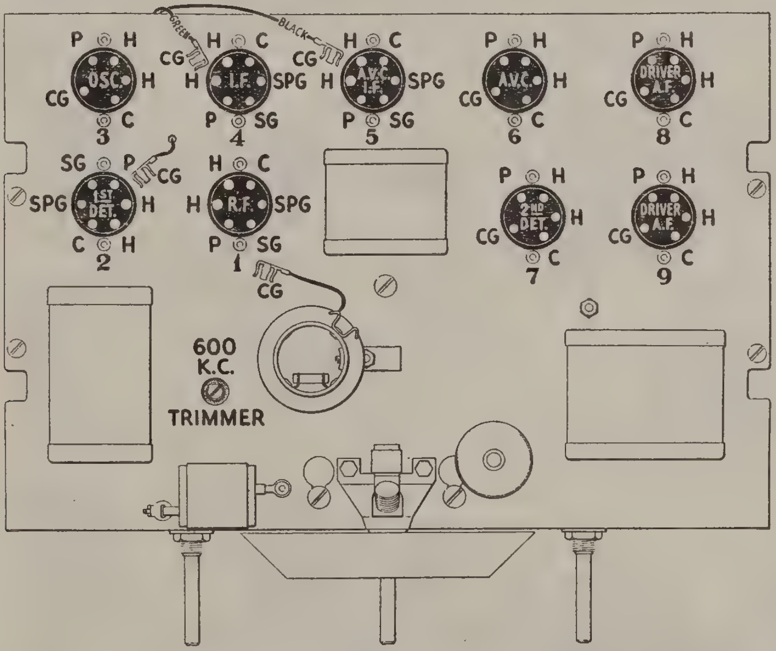


Figure 5—Radiotron Socket Layout

However, if the receiver is to be operated in a locality remote from stations where the usual signal intensity is low, a slight change may be made in the receiver chassis that will extend the A.V.C. action to signals of much lower input. This may be done by removing the chassis and connecting a wire from the terminal on the 400 ohm section of the volume control to ground. Figure 4 shows the details of this change. It should be remembered when making this change that the noise level between stations will greatly increase when the change is made, due to the secondary section of the volume control not being in the circuit.

(3) R.F. AND OSCILLATOR LINE-UP CAPACITOR ADJUSTMENTS

Four adjustable capacitors are provided for aligning the R.F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency — 175 K.C.— difference from that of the incoming signal. Poor quality, insensitivity, poor A.V.C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with — the intermediate transformer tuning capacitors — the following procedure may be used for aligning these capacitors:

(a) Procure an R.F. Oscillator giving a modulated signal at 600 K.C. and 1400 K.C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A.C. voltmeter connected across the reproducer unit cone coil.

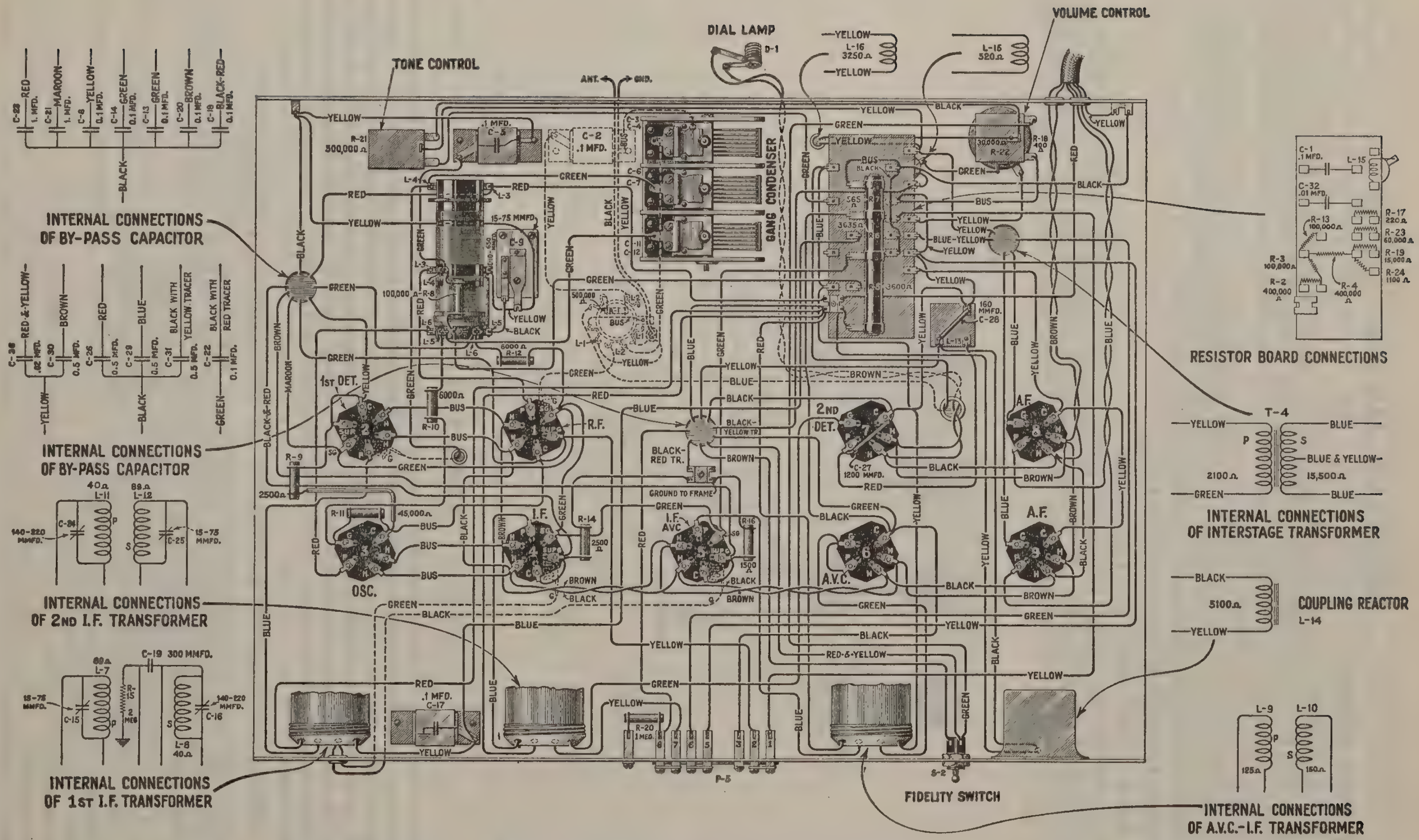


Figure 6—Receiver Assembly Wiring Diagram

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A.V.C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A.V.C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the short line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K.C. and couple its output to the antenna. Set the dial scale at exactly 1400. Connect the output meter to the set and place the volume control at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench — the nuts are at ground potential — adjust the oscillator, first detector and R.F. line-up capacitors, until a maximum deflection is obtained in the output meter. These capacitors are accessible through holes located in the bottom cover of the chassis, the one to the front being the R.F., the detector next and the oscillator to the rear.

(g) Set the oscillator at 600 K.C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K.C. series capacitor, Figure 5, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

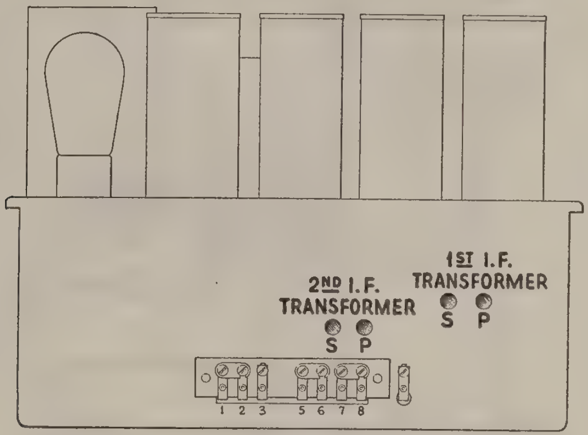


Figure 7—Location of I. F. Tuning Capacitors

(h) Change the frequency of the oscillator to 1400 K.C. and set the dial at 1400. Again make the adjustments given under (f) and (g).

So adjusted, the R.F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R.F. signal.

(4) I.F. TUNING CAPACITOR ADJUSTMENTS

Although this receiver has two I.F. stages, one for the second detector and one for the A.V.C., only two of the three I.F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A.V.C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K.C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R.F. oscillator that gives a modulated 175 K.C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A.C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A.V.C. socket.

(d) Remove the oscillator tube, see Figure 5, and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure 7. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

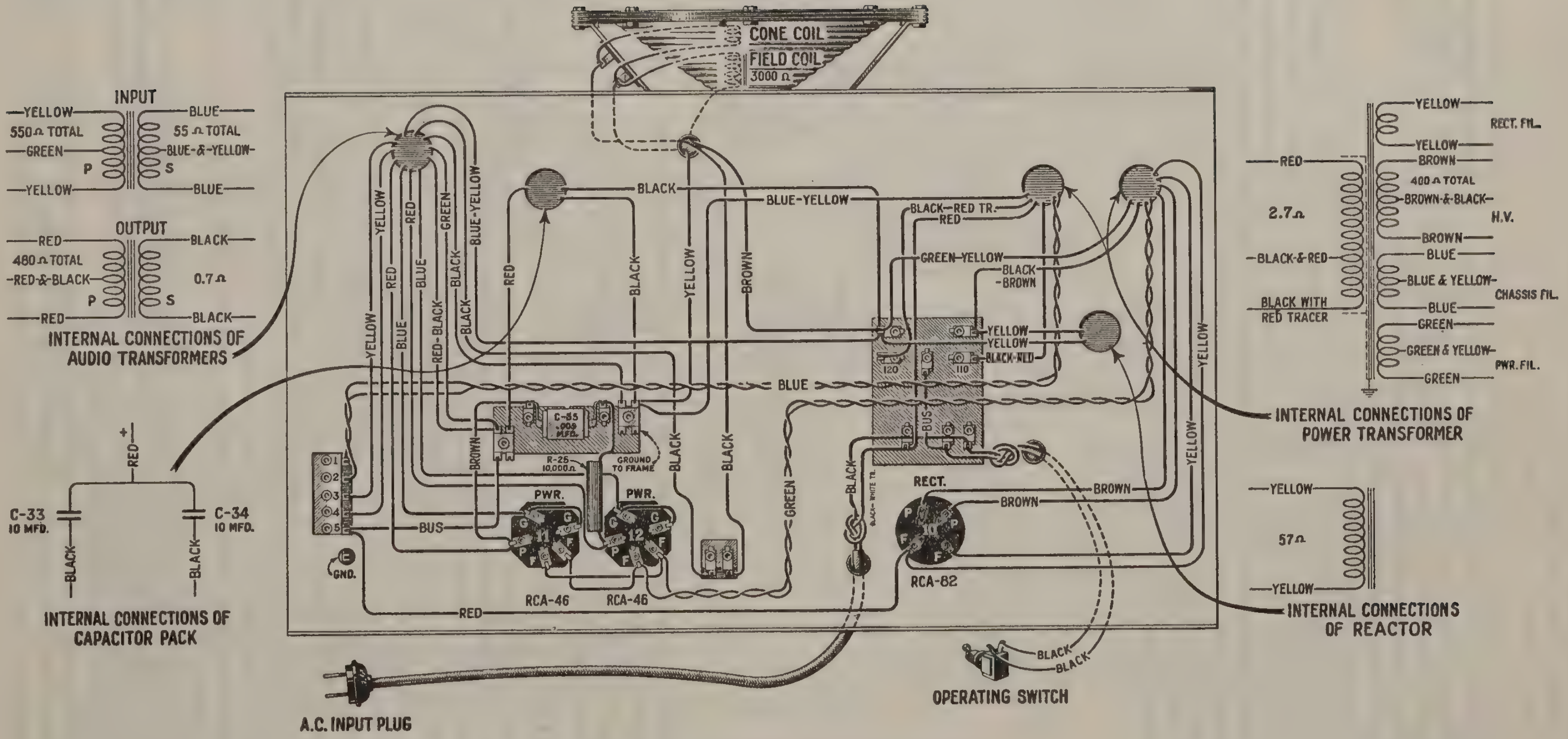


Figure 8—Amplifier Wiring Diagram

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I.F. adjustments with the R.F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceeding section.

(5) VOLTAGE READINGS

The following voltages taken at each Radiotron socket with the receiver operating but no signal being received should prove of value when checking with the usual set analyzer. The plate currents given are not necessarily accurate for each tube due to the cable in the test box causing some circuits to oscillate. Small variations may be caused by different tubes and line voltages. Therefore, the following values must be taken as approximately those that will be found under varying conditions. The numbers in column 1 indicate the socket numbers shown in Figure 5.

It will be noted that the present type set analyzers do not have provision for the new six prong Radiotrons. In such cases a set of adapters will be necessary in order to take suitable readings.

RADIOTRON SOCKET VOLTAGES

120 Volt, A.C. Line

No signal being received — Volume Control at minimum

Tube No.	Cathode to Heater Volts D. C.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current M. A.	Heater or Filament Volts, A. C.
1—R.F.	7.0	0	100	210	3.0	2.5
2—1st Det.	10.0	0	95	210	1.5	2.5
3—Osc.	7.0	0	—	70	5.0	2.5
4—I.F.	8.0	0	95	210	2.5	2.5
5—A.V.C.—I.F.	7.0	0	95	210	3.0	2.5
6—A.V.C.	15.0	0	—	0	0	2.5
7—2nd Det.	12.0	12.0	—	200	1.0	2.5
8—A.F.	11.0	8.0	—	210	5.0	2.5
9—A.F.	11.0	8.0	—	210	5.0	2.5
10—Pwr.	—	0	—	400	6.0	2.5
11—Pwr.	—	0	—	400	6.0	2.5

(6) MAGNETIC PICKUP CONNECTIONS

Due to the audio system of the receiver being designed to compensate for the radio end of the receiver, its characteristics must be altered slightly for phonograph operation. It is therefore necessary to use the auxiliary switches, resistors and capacitors with the T-5 and PT-33 shown in Figures 9 and 10 as well as the complete switching shown in Figure 11 when making connections to magnetic pickups. When using these devices, the usual record volume control should be set at maximum and the volume adjusted by means of the "Radio" volume control. In some cases a slight reduction of the high frequencies by means of the tone control may prove desirable. If the degree of compensation is too great—too many highs and lows—this may be remedied by reducing the record volume control setting and advancing the radio volume control.

(7) SHORT WAVE ADAPTER CONNECTIONS

Figure 12 shows the correct connections for attaching the Short Wave Adapter SW-2 to the R-78.

It will be noted that the Wafer Connector is not used due to the output rectified voltage being too high. The output voltage from terminal No. 5 on the amplifier is approximately 230 volts and is therefore suitable for this use.

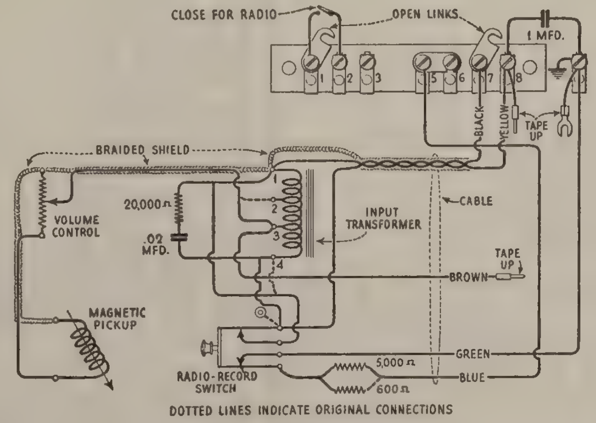


Figure 9—Connections for Attaching End Table Model E-52

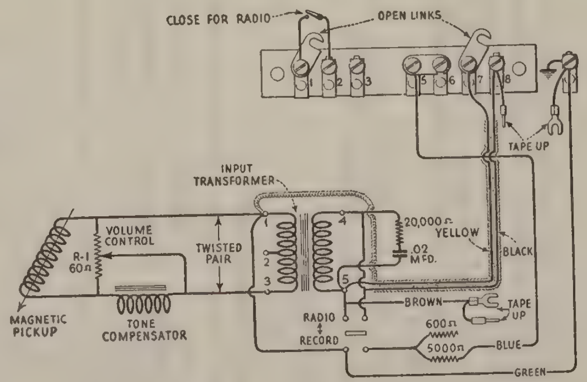


Figure 11—Connections for Attaching Magnetic Pickup

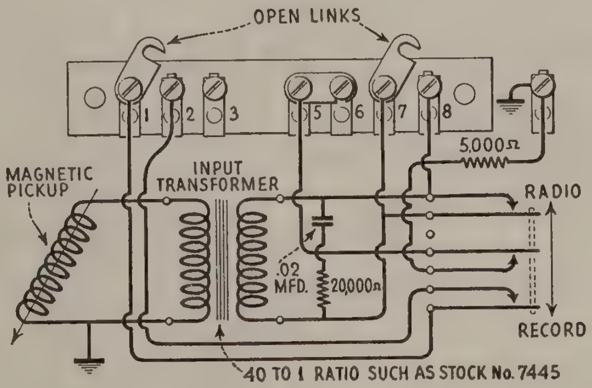


Figure 10—Connections for Attaching
RCA Victor Portable Turntable Model PT-33

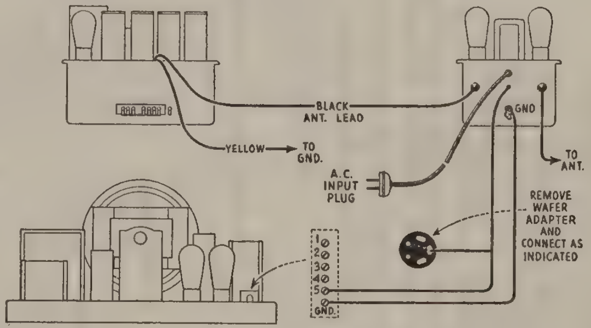


Figure 12—Connections for Attaching Short Wave Convertor Model SW-2

Note: The above connections are for models not having noise suppressor. Identical connections are used for models having noise suppressor, except connections shown to terminal No. 5 are made to No. 4.

DATA FOR MODELS WITH NOISE SUPPRESSOR

ELECTRICAL SPECIFICATIONS

Voltage Rating	105/125 Volts
Frequency Rating	50/60 Cycles
Power Consumption	110 Watts Average
(The input wattage may vary from 70 to 130 watts, depending on the output volume being used)	
Recommended Antenna Length	25–100 Feet
Type of Circuit	Super-Heterodyne with A. V. C., Compensated A. F. System, Class "B" Output Stage and Noise Suppressor
Type and Number of Radiotrons	1 RCA-55, 4 RCA-58, 4 RCA-56, 2 RCA-46, 1 RCA-82—Total 12
Number of R. F. Stages	One
Type of First Detector	Exponential with Control Grid Voltage Varied by A. V. C. Tube
Number of Intermediate Stages	Two: One for Signal and One for A. V. C.
Type of Second Detector	Power Grid Bias
Number of A. F. Stages	Two: One Push-Pull Driver and One Class "B" Output
Type of Tone Control	Reactor Capacitor and Variable Resistance for Reducing High Frequency Response
Type of Rectifier	Mercury Vapor Full Wave RCA-82
Undistorted Output	Approximately 20 Watts Maximum

PHYSICAL SPECIFICATIONS

Height	43 Inches
Width	28¼ Inches
Depth	14 Inches
Weight Packed for Shipment	168 Pounds

RCA Victor Model R-78 with noise suppressor is a 12 tube Super-Heterodyne Radio Receiver, incorporating the usual Super-Heterodyne features, together with the new RCA Victor Automatic Volume Control, Compensated Audio System, Automatic Noise Suppressor and Class "B" Output Amplifier. These features, mainly evidenced by the greatly improved tone quality, high output and quiet operation, give the R-78 a degree of performance not obtained with any existing type of radio receiver.

The R-78 with noise suppressor is similar in most respects to the standard R-78 and a reference to the preceding section will give information pertaining to it. The major difference between these models is the noise suppression equipment which also necessitates the use of a new Radiotron—the RCA-55. A brief description of the operation of this circuit follows:

The function of the noise suppressor circuit is to reduce noise, by greatly decreasing the sensitivity of the receiver when no carrier waves are being received. A manually operated sensitivity control is also provided so that the overall sensitivity of the receiver may be adjusted, thereby eliminating the reception of signals having too great a noise level. This feature operates without introducing distortion, a quality not present in other type noise suppressor circuits.

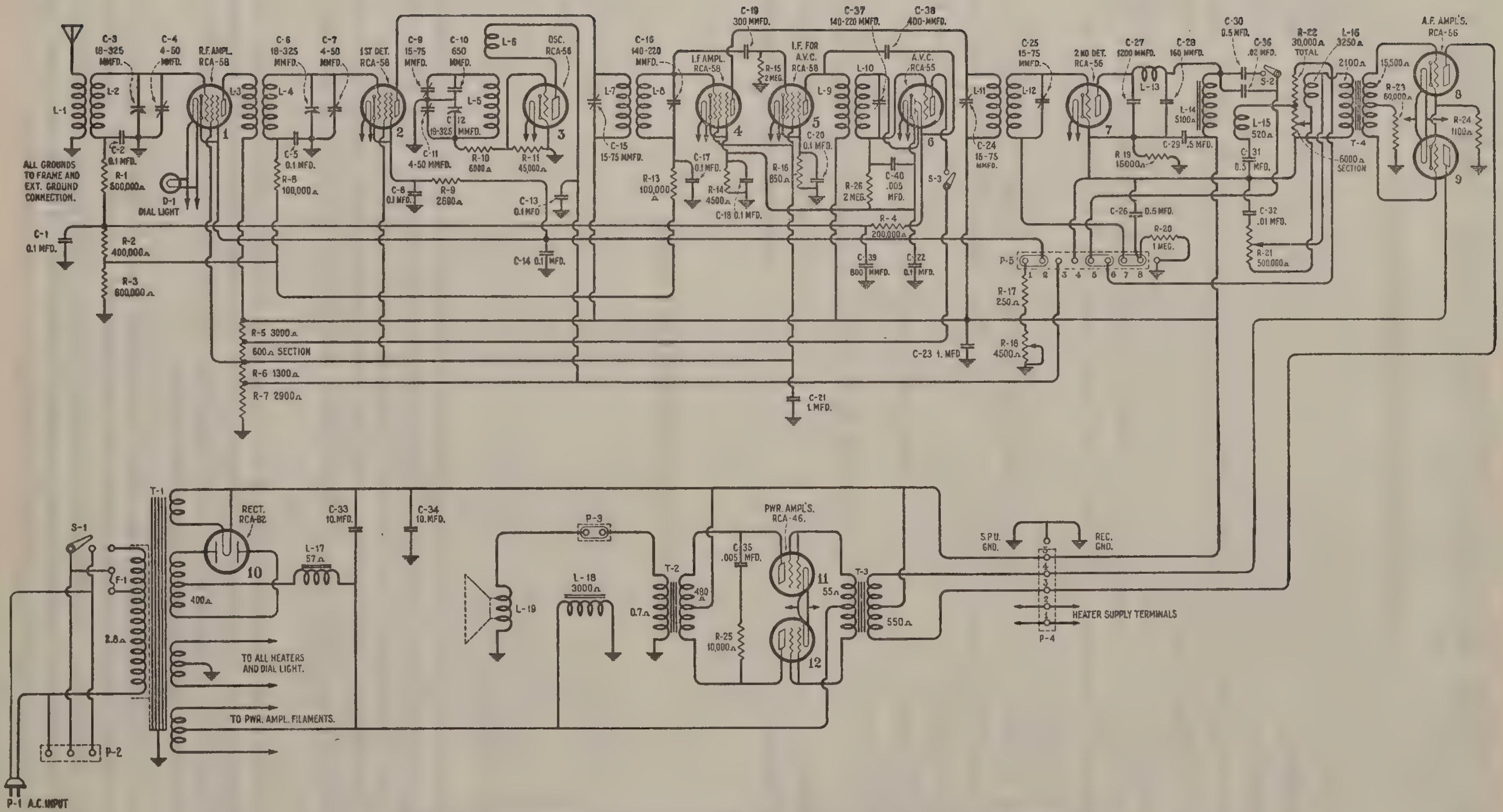


Figure 13—Schematic Circuit Diagram (Model With Noise Suppressor)

A reference to the schematic diagram, Figure 1, will show the circuit used in conjunction with the Radiotron RCA-55 for obtaining the noise suppressor action.

The two channel intermediate amplifiers are similar in operation to the older Model R-78 with one channel supplying the signal voltage to the second detector and the other supplying signal voltage to the A. V. C. and noise suppressor circuit.

The untuned intermediate I. F. transformer used in the older Model R-78 has been changed to a natural period plate coil L-9 and a sharply tuned secondary coil L-10. Coil L-9 supplies the voltage to operate the A. V. C. circuit, while coil L-10 supplies that used to operate the suppressor circuits. An examination of this circuit will show that with no signal voltage impressed on coil L-10, no current is rectified in the Diode plate and hence the grid of the Radiotron RCA-55 operates at zero bias. The plate current is then at a maximum value—approximately 10 M. A.—and since the cathodes of the Radiotron RCA-55 and the signal channel I. F. tube are common, the I. F. tube is biased to cut-off. This, therefore, prevents signal voltage from reaching the second detector.

When the receiver is tuned to a signal, the signal voltage is amplified in the A. V. C. amplifier and impressed on coils L-9 and L-10. On the positive half of the signal voltage, the signal is rectified in the suppressor circuit which generates a negative potential on the grid of the Radiotron RCA-55. The plate current is thereby reduced to approximately zero, which releases the high bias potential on the signal channel I. F. amplifier. Signal voltage will then be impressed on the second detector.

A. V. C. bias for the R. F., first detector and I. F. tubes will be generated when the I. F. voltage on the A. V. C. Diode overcomes and exceeds the positive potential on the cathode of the Radiotron RCA-55. This bias is approximately 10 volts when the receiver is tuned to signal.

The second I. F. transformer feeding the second detector has been changed to two high impedance circuits in order to provide the proper amplification with the increased bias resistor in the I. F. cathode circuit.

The suppressor circuit L-10 has been designed to be a sharp circuit so that the action of the suppressor comes as near the center of the carrier as possible.

The sensitivity control is in the cathode circuit of the R. F. and first detector and reduces the sensitivity of the receiver by increasing the residual bias on these Radiotrons. One end of the sensitivity control has a switch which is provided so that the noise suppressor circuit may be cut out. Under this condition the full sensitivity of the receiver is obtained.

(1) I. F. TUNING ADJUSTMENTS

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only five of the circuits are tuned by adjustable capacitors and require adjustment. The coil used for the A. V. C. is broadly tuned and does not require any adjustment, while the one used for the noise suppressor circuit is sharply tuned. Refer to Figure 4 for location of the adjusting screws.

The transformers are all tuned to 175 K. C., and adjustments are made for maximum output.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, or a low range A. C. voltmeter connected across the reproducer unit cone coil.

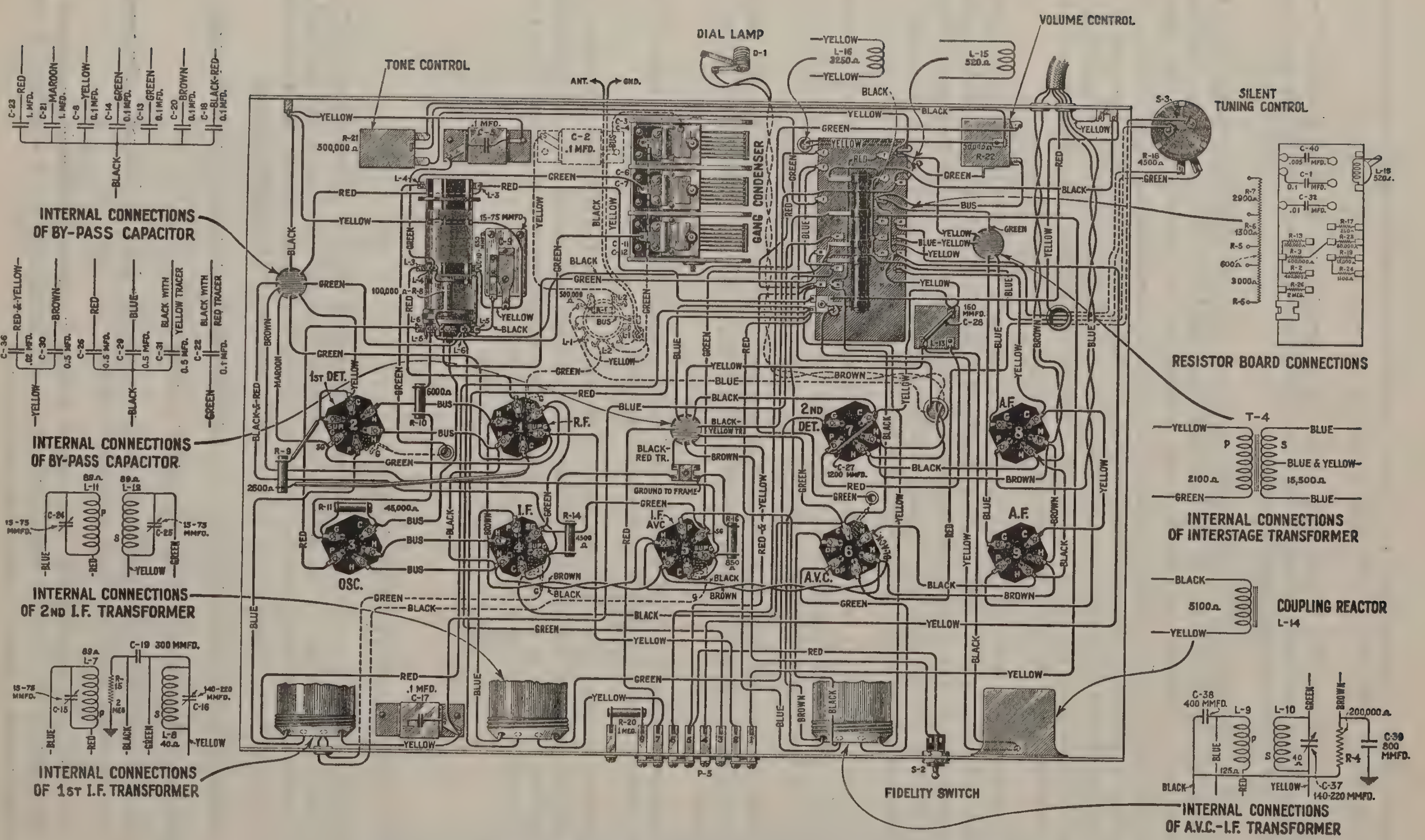

TONE CONTROL
DIAL LAMP
VOLUME CONTROL
SILENT TUNING CONTROL
GANG CONDENSER
RESISTOR BOARD CONNECTIONS
INTERNAL CONNECTIONS OF BY-PASS CAPACITOR
INTERNAL CONNECTIONS OF BY-PASS CAPACITOR
INTERNAL CONNECTIONS OF 2ND I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 1ST I.F. TRANSFORMER
INTERNAL CONNECTIONS OF INTERSTAGE TRANSFORMER
COUPLING REACTOR
L-14
INTERNAL CONNECTIONS OF A.V.C.-I.F. TRANSFORMER
FIDELITY SWITCH
S-2
P-5
T-4
1ST DET.
R.F.
2ND DET.
A.F.
A.F.
OSC.
I.F.
I.F. AVC
A.V.C.
ANT.
GND.
GROUND TO FRAME
BLACK-RED TR.

Figure 14—Receiver Wiring Diagram (Model with Noise Suppressor)

(c) Remove the oscillator tube and make a good ground connection to the chassis. Place the test oscillator in operation and couple its output from the control grid of the first detector to ground. With the receiver volume control at maximum, the noise suppressor control at its extreme counter-clockwise position and the noise suppressor switch open, adjust the oscillator output until a deflection is obtained in the output meter.

(d) Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

(e) Then close the noise suppression control switch by advancing slightly clockwise, but do not advance the control beyond the snapping of the switch. The single noise suppressor circuit should then be adjusted for maximum output.

The points to remember when making these adjustments are that no dummy Radiotron is used and a minimum of input signal is necessary. An excessive signal will make it impossible to get correct adjustments of the signal channel I. F. and especially the suppressor circuit.

It is necessary, when adjusting the suppressor circuit, that the input signal be kept just as low as possible so that the output meter follows every change in the adjustment of the suppressor I. F. circuit.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section of this booklet.

(2) RADIOTRON SOCKET VOLTAGES

The following voltages are those at which the Radiotrons actually operate and not those of a particular set analyzer. It is therefore necessary that the serviceman allow corrections for circuits having high resistance and for meter scales having a relative low resistance. Usually an application of Ohms Law will give an approximate value of the voltage that will be read on a particular meter, assuming that the resistance of the meter is known.

RADIOTRON SOCKET VOLTAGES

120 Volt Line—Fuse at 120 Volt Tap—Antenna Shorted to Ground—No Signal

Radiotron No.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts D. C.	Cathode or Filament to Plate Volts D. C.	Diode Plate No. 1 to Cathode Volts D. C.	Diode Plate No. 2 to Cathode Volts D. C.	Plate Current M. A.	Heater or Filament Volts D. C.
1. RCA-58—R. F.	— 3.5	106	212	—	—	6.5	2.5
2. RCA-56—Osc.	—	—	65	—	—	4.5	2.5
3. RCA-58—1st Det.	— 9	101	206	—	—	1.8	2.5
4. RCA-58—I. F.	—12	98	203	—	—	2.0	2.5
5. RCA-58—A. V. C. I. F.	— 5	106	210	—	—	4.0	2.5
6. RCA-55—A. V. C. Sup. (Sensitivity Control At Minimum)	0	—	0	0	—12	0	2.5
6. RCA-55—A. V. C. Sup. (Sensitivity Control At Maximum)	0	—	69	0	36	8.0	2.5
7. RCA-56—2nd Det.	—15	—	200	—	—	1.0	2.5
8. RCA-56—Driver	—11	—	204	—	—	5.0	2.5
9. RCA-56—Driver	—11	—	204	—	—	5.0	2.5
10. RCA-46—Power	0	0	400	—	—	6.0	2.5
11. RCA-46—Power	0	0	400	—	—	6.0	2.5
12. RCA-82—Rectifier	462.5 Volts R. M. S. Each Plate.—72 M. A. Total Plate Current.						

REPLACEMENT PARTS

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2723	Switch—Fidelity switch—Package of 5	$3.00
2746	Socket—Dial lamp socket	.50
2747	Contact cap—Package of 5	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	2.50
3055	Cushion—Sponge rubber chassis support cushions—One set of 4	.50
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	2.50
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	2.00
6189	Bracket—Dial lamp bracket and indicator—Package of 2	.65
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.50
6251	Capacitor—1200 mmfd.—Package of 5	2.30
6275	Volume control—Complete with mounting nut	3.25
6276	Tone control—Complete with mounting nut and washer	2.10
6277	Capacitor—0.1 mfd. capacitor—Located on resistor board	.75
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	2.50
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	2.50
6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5	2.50
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	2.50
6283	Resistor—Voltage divider resistor	1.50
6284	Reactor—Tone control reactor	1.35
6285	Choke coil—2nd detector plate choke coil	1.10
6286	Capacitor—0.1 mfd. capacitor	.70
6288	Knob—Station selector—Tone control or volume control knob—Package of 5	1.50
6298	Cord—3 gang tuning capacitor drive cord—Package of 5	1.00
6308	Coil—R.F. coil complete with mounting bracket	1.90
6312	Capacitor—650 mmfd.—Oscillator series—Package of 5	2.50
6313	Resistor—220 ohms—Carbon type—½ watt—Package of 5	2.50
6314	Capacitor—160 mmfd.—Package of 5	2.50
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5	2.50
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	2.50
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.85
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	1.00
7065	Screwdriver—Non-metallic screwdriver for oscillator and I.F. adjustments	1.10
7298	Capacitor—0.01 mfd. capacitor—Located on resistor board	.80
7438	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	5.20
7439	Drum—Dial drum with set screws and 3 dial mounting nuts	.50
7440	Scale—Dial and dial scale	.75
7477	Capacitor pack—Comprising two 1. mfd. and five 0.1 mfd. capacitors in metal container	2.90
7478	Capacitor pack—Comprising four 0.5 mfd., one .02 mfd., and one 0.1 mfd. capacitors in metal container	3.00
7479	Transformer—Interstage audio transformer in metal container	3.90
7480	Transformer—1st intermediate frequency transformer	3.15
7481	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7483	Reactor—Volume control compensating reactor	1.00
7484	Socket—UY type Radiotron socket—5 used	.65
7485	Socket—Radiotron 6 contact socket—4 used	.70
7486	Board—Phonograph terminal board—8 terminals and 3 links	1.00
7487	Shield—Radiotron tube shield—7 used—Plain finish.	.50
7488	Shield—Tube shield top—1 used—Plain finish	.50
7490	Board—Resistor board—Less resistors and capacitors.	1.10
7492	Transformer—3rd intermediate transformer	3.00
7498	Reactor—Coupling reactor	2.50
7499	Transformer—2nd intermediate transformer	3.00
7500	Cable—6 conductor—From receiver to S.P.U.	1.50
	SPECIAL PARTS FOR MODELS WITH NOISE SUPPRESSOR	
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	$2.57
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	2.50
3437	Knob—Noise suppressor rheostat knob	.60
3439	Resistor—600,000 ohms—Carbon type— 1 watt—Package of 5	2.50
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	2.50
3441	Resistor—850 ohms—Carbon type—½ watt—Package of 5	2.50
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	2.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	2.00
6351	Resistor—Voltage divider resistor	1.00
6352	Transformer—Third intermediate transformer	3.00
6353	Transformer—Second intermediate transformer	3.00
6354	Rheostat—Noise suppressor rheostat	1.90
6355	Volume control—Complete with mounting nut	1.90
6356	Capacitor—0.1 mfd. capacitor—Located on resistor board	.70
7504	Coil—Detector and oscillator coil complete with mounting bracket	3.50
7505	Shield—Tube shield top—1 used—Maroon	.50
7506	Shield—Radiotron tube shield—7 used—Maroon	.55
	AMPLIFIER ASSEMBLIES	
2725	Fuse—1.5 ampere—Cartridge type fuse—Package of 5	.50
2731	Resistor—10,000 ohms—1 watt—Carbon type resistor—Package of 5	2.00
2757	Strip—Terminal strip—2 terminals	.50
3032	Socket—UX type Radiotron socket with insulator	.50
3056	Shield—Radiotron tube shield—Package of 2	.50
3099	Capacitor—.005 mfd. capacitor	.75
3147	Cover—Fuse cover with bushing and insulator	.95
6289	Strip—Terminal strip—5 terminals	.85
6290	Board—Terminal board complete with terminals, fuse clips, and insulator	1.00
6291	Board—Terminal board complete with terminals and insulator—Less capacitor	.90
6292	Switch—Operating switch	1.25
7054	Cord—Power cord	1.00
7370	Cover—Terminal strip cover with insulator—5 terminals	.55
7491	Socket—UY type Radiotron socket with insulator	.70
8910	Capacitor pack—Comprising two 10 mfd. capacitors in metal container	7.00
8911	Reactor—Filter reactor	4.75
8912	Transformer—Audio transformer pack comprising input and output transformers in metal container.	6.50
8913	Transformer—Power transformer—105–125 volts, 50–60 cycles	12.50
8914	Transformer—Power transformer—105–125 volts, 25–50 cycles	16.00
8915	Transformer—Power transformer—200–250 volts, 50–60 cycles	13.50
10907	Fuse—3 ampere fuse (for 25 cycle use)—Package of 5.	.50
	CABINET ASSEMBLIES Prices Furnished Upon Request	
2776	Catch assembly—Door catch and strike with nails—Package of 2 sets	
6293	Pull—Door pull with mounting screw and back plate	
6294	Hinges—Door hinges—Set of 4 hinges with mounting screws	
7441	Escutcheon—Station selector escutcheon	
X168	Escutcheon—Station selector escutcheon (For models with noise suppressor)	
9413	Cabinet—Cabinet complete—Less equipment	
X101	Top—Cabinet top	
X102	Panel—Control panel	
X103	Leg—Cabinet leg	
X104	Foot—Cabinet foot	
X105	Doors—Cabinet door—Right and left hand—1 pair	
X106	Board—Baffle board with grille cloth and reproducer pad—Assembled	
X107	Ornament—Front corner post ornament—1 pair	
X108	Stretcher—Stretcher assembly comprising front, back, and side rails	
	REPRODUCER ASSEMBLIES	
7292	Screw assembly—Comprising two screws, two nuts, two lock-washers, and 1 plate—For mounting speaker to amplifier	.95
8559	Ring—Cone retaining ring	.80
8916	Cone—Reproducer cone complete with voice coil—Package of 5	15.00
9418	Coil assembly—Comprising field coil, magnet, and cone support	12.00

Instructions for

RCA Victor RE-80

Radiola – Electrola

INSTALLATION

Preliminary—After unpacking the instrument, remove the unfinished wood shipping strip fastened across the rear of the receiver chassis. Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron *only*, the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Remove the packing material from the phonograph compartment. With the speed shifter (see Figure 3) set in the outward (78 R. P. M.) position, mount the turntable (packed in outfit package) on the motor spindle. Make sure that the drive pin engages the slot in the turntable hub. Insert the used-needle cup in the opening provided.

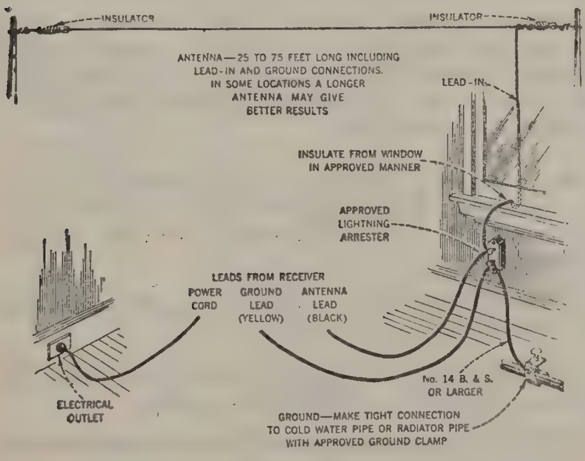

INSULATOR
INSULATOR
ANTENNA—25 TO 75 FEET LONG INCLUDING LEAD-IN AND GROUND CONNECTIONS. IN SOME LOCATIONS A LONGER ANTENNA MAY GIVE BETTER RESULTS
LEAD-IN
INSULATE FROM WINDOW IN APPROVED MANNER
APPROVED LIGHTNING ARRESTER
LEADS FROM RECEIVER
POWER CORD
GROUND LEAD (YELLOW)
ANTENNA LEAD (BLACK)
No. 14 B. & S. OR LARGER
ELECTRICAL OUTLET
GROUND—MAKE TIGHT CONNECTION TO COLD WATER PIPE OR RADIATOR PIPE WITH APPROVED GROUND CLAMP

Figure 1

Important—Remove the two *red* hex-head bolts which pass through the motor board mounting rails, accessible from the rear of the cabinet. Then remove the two unfinished wood blocks from between the motor board and the mounting rails. The motor board should then float freely on its spring suspension.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

External Connections—Figure 1 shows the external connections and recommended antenna system. It is essential that a good ground connection be provided. Make connections to the antenna and ground as illustrated. Then connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) for which the instrument is rated (see rating label on rear of receiver).

RADIO OPERATION

The radio operating controls are shown in Figure 2. Proceed as follows:

1. Set the radio-record transfer switch to "Radio" by turning the Record Volume Control to the extreme counter-clockwise position.

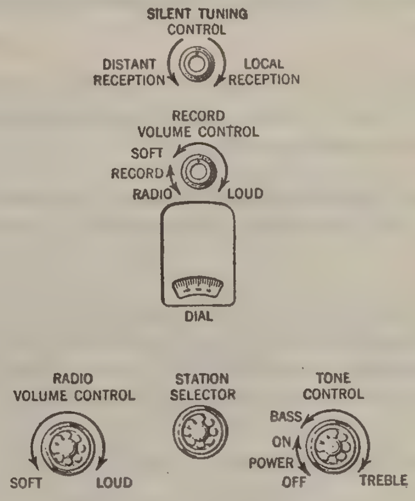


Figure 2

2. Apply power by turning the Tone Control knob clockwise from the "off" position; set this control near the middle of its range. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

3. Set both the Radio Volume Control and the Silent Tuning Control to the extreme clockwise position. Turn the Station Selector to a point, near mid range, at which no station is heard within several scale divisions. Next turn the Silent Tuning Control counter-clockwise until background noise (static) is heard, then turn it slightly clockwise until the noise just disappears.

NOTE—The adjustment just described provides quiet tuning, that is, suppression of background noise between station settings, and permits reception of all stations whose signals are above the existing noise level.

4. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles for locating stations of known frequency assignment.)

NOTE—Should no station be heard at any point on the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent Tuning Control counter-clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is of course to be expected.

5. After receiving a signal, turn the Radio Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. *This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.*

6. Adjust the Radio Volume Control to secure the desired volume.

NOTE—The *automatic volume control* maintains the volume substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength may be received at approximately the same volume without readjustment of the volume control.

7. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference (when tuned to a station).

8. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging Radiotrons of the same type in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

PHONOGRAPH OPERATION

Electric phonograph facilities are provided in this instrument for playing either standard (78 R. P. M.) records or long playing (33⅓ R. P. M.) records. The pickup mechanism is designed to use *Chromium Needles for Long Playing Records* (identified by the orange shank) for the reproduction of either long playing or standard records. These needles with care should play 25 records. *Never re-insert a used Chromium needle after once removing from the pickup.*

Standard (78 R. P. M.) Records—Refer to Figures 2 and 3:

1. Turn the Record Volume Control clockwise from the "Radio" position, until the spot on the knob is upward.

2. Apply power by turning the Tone Control knob clockwise from the "off" position. Set this control at or near the extreme clockwise position. Several seconds will be required for the Radiotrons to heat before reproduction is possible.

3. Place a standard (78 R. P. M.) record on the turntable. Loosen the needle screw on the electric pickup. Insert a Chromium needle, or a full volume (full tone) steel or Tungstone needle, as far as it will go and tighten the needle screw. (Do not play more than one record with each steel needle.)

4. Pull the starting lever forward to start the turntable. Set the speed shifter outward for 78 R. P. M. Then place the needle on the smooth outer surface of the record and slide it into the first groove.

5. Adjust the Record Volume Control to obtain the desired volume.

6. The Record Tone Range Switch should normally be set toward the front of the cabinet, in which position most faithful reproduction over the entire musical range is obtained. To reduce needle scratch noise, particularly on old type records, this switch may be reset toward the rear of the cabinet.

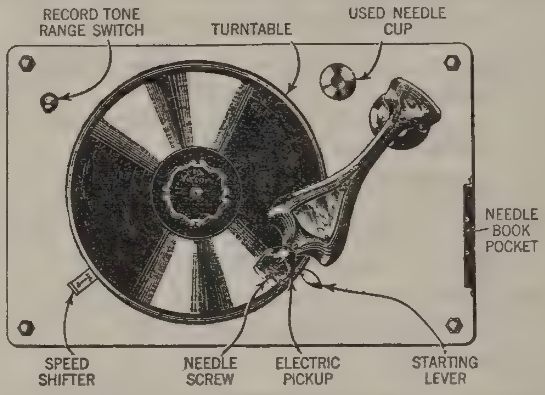


Figure 3

7. When the record has been played, lift the pickup and move it to the right so as to clear the turntable, thereby stopping the motor. (When through playing an eccentric groove record the motor will stop automatically.)

8. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position. The pickup should never be left with the needle resting on the record (or turntable) when not operating the phonograph.

Long Playing (33⅓ R. P. M.) Records—Refer to Figures 2 and 3. Repeat the procedure outlined under "Standard (78 R. P. M.) Records," with the following exceptions:

(1) Use only *Chromium Needles for Long Playing Records* (identified by the orange shank).

(2) Set the speed shifter inward, for 33⅓ R. P. M. This should be done while the turntable is rotating.

Lubrication—The motor should be lubricated with light oil once every six months. Two oil holes are accessible on top of the motor, when the turntable is removed. The ball bearing mechanism under the turntable should be lubricated once a year by prying off the cover and packing with vaseline or light motor grease, being careful to prevent any dirt particles from entering with the grease. Make sure that the speed shifter is in the outward (78 R. P. M.) position before replacing the turntable on the spindle.

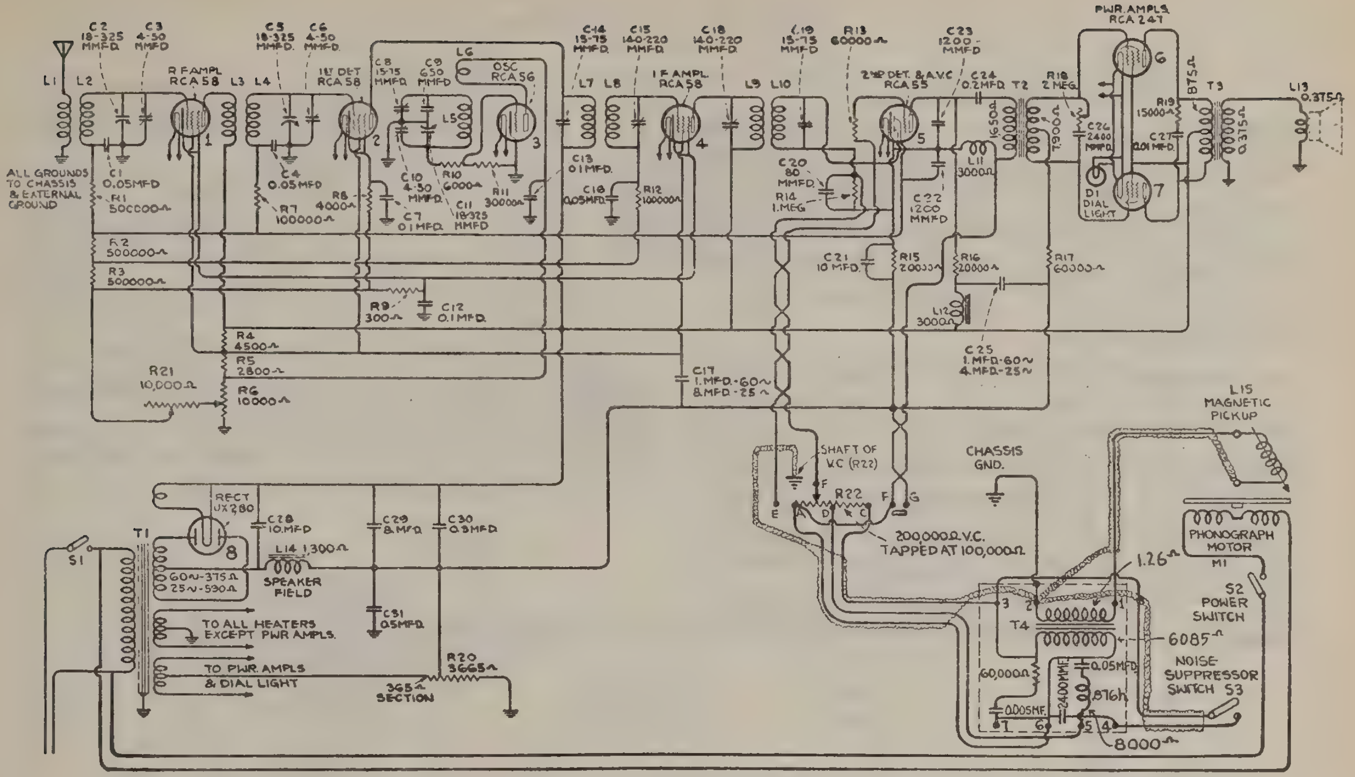


Figure A—Schematic Wiring Diagram

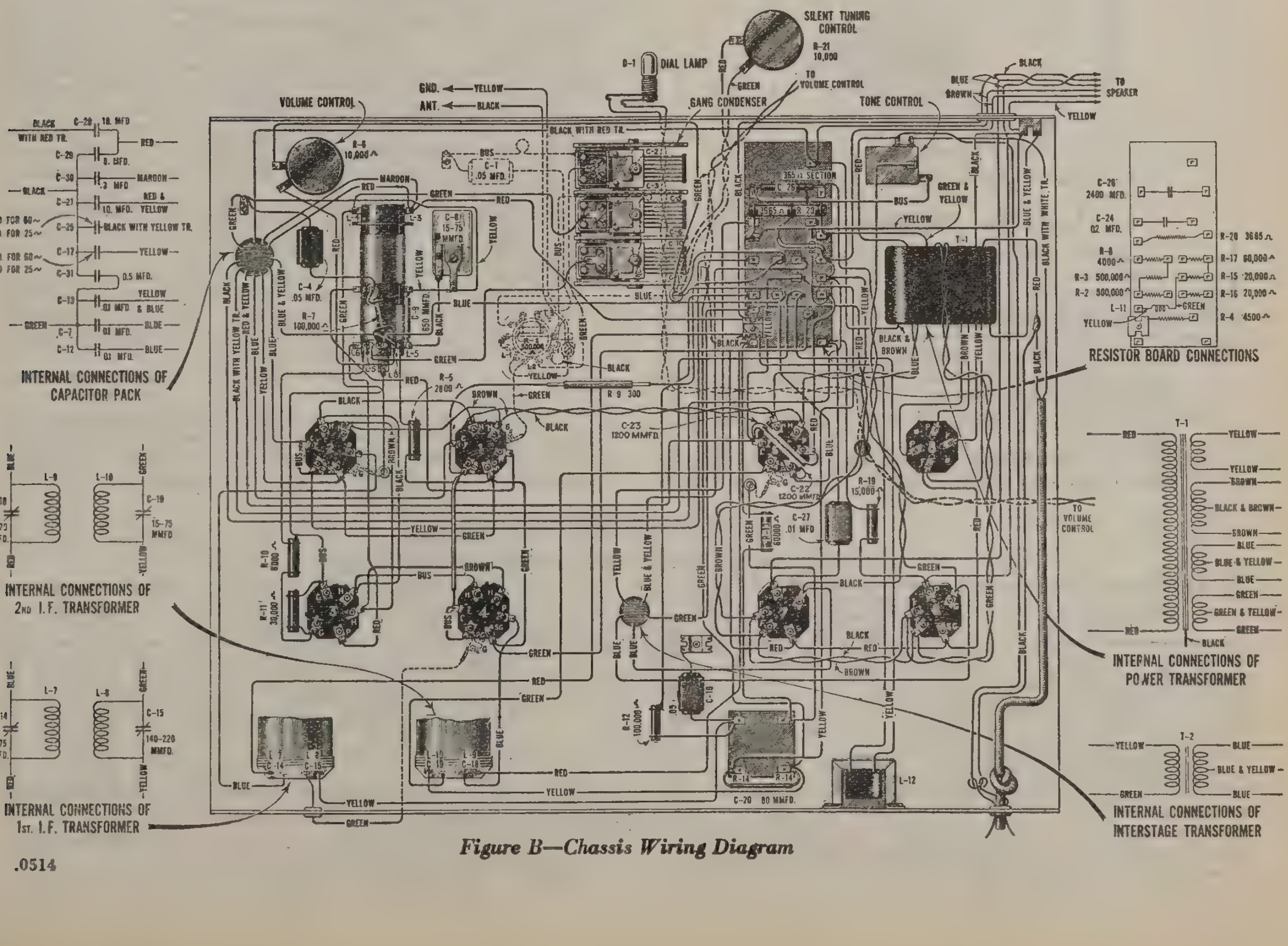


Figure B—Chassis Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105-125 Volts
Power Consumption	120 Watts
Type and Number of Radiotrons	3 RCA-58, 1 RCA-56, 1 RCA-55, 2 RCA-247, 1 UX-280—Total, 8
Type of Circuit	Super-Heterodyne with A. V. C., tone control and push-pull Pentode Output
Undistorted Output	3 Watts
R. F. and Oscillator Alignment Frequency	600 K. C. and 1400 K. C.
Intermediate Frequency	175 K. C.
Type of Magnetic Pickup	Low Impedance with Inertia Type Tone Arm
Type of Turntable	Two Speed with Ball Race Reducer

This combination instrument uses an eight tube chassis incorporating automatic volume control, tone control, noise suppressor and push-pull Pentode output stage. Due to the excellent high frequency response of this receiver, a switch is provided for reducing the high frequency response when playing records having a high value of needle scratch. The radio-record switch and record volume control are one unit, accessible from the front. High and low frequency compensation is incorporated in the record audio system.

Service work will be found to be similar to that of other Super-Heterodyne receivers incorporating automatic volume control.

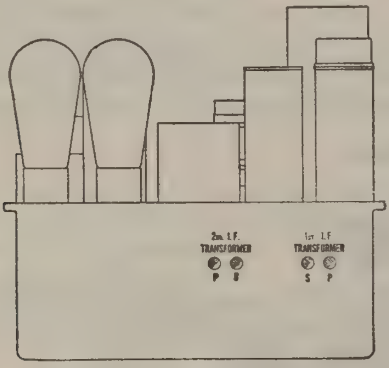


Figure C—I. F. Alignment Location

Line-Up Adjustments

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from the rear of the chassis. See Figure C for location of the adjustment screws and proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the 1st detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a *slight deflection* is obtained in the output meter.

(d) Adjust the secondary and then the primary of the second and then the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. Adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible through the bottom cover and the 600 K. C. oscillator trimmer through the top of the chassis adjacent to the R. F. coil. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

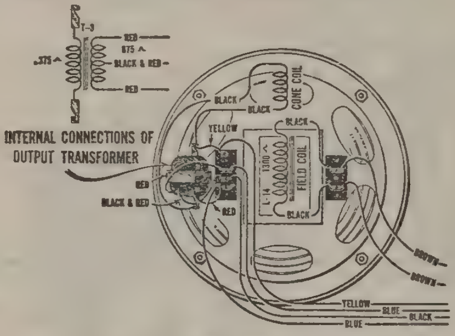


Figure D—Loudspeaker Wiring

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the short line on the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) Adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, accessible through the top, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

120 Volts, 60 Cycles, A. C. Line—V. C. at Maximum and No Signal

Radiotron No.	Control Grid to Filament or Cathode Volts	Screen Grid to Filament or Cathode Volts	Plate to Filament or Cathode Volts	Plate Current M. A.	Heater or Filament Volts
1. R. F. RCA-58	4.5	100	165	6.0	2.37
2. 1st Det. RCA-58	11.0	95	155	1.5	2.37
3. Oscillator RCA-56	—	—	70	4.5	2.37
4. I. F. RCA-58	4.5	100	165	6.0	2.37
5. 2nd Det. RCA-55 and A.V.C.	—	—	55	4.7	2.37
6. Power RCA-247	19.0	235	225	20.0	2.37
7. Power RCA-247	19.0	235	225	20.0	2.37

OTHER IMPORTANT VOLTAGES

2nd Detector and A.V.C. Cathode to Low Side of Field	105 Volts
Chassis to Low Side of Field	90 Volts
Voltage Across Field	120 Volts
Rectifier	370 Volts R.M.S. Each Plate—80 M.A. Each Plate

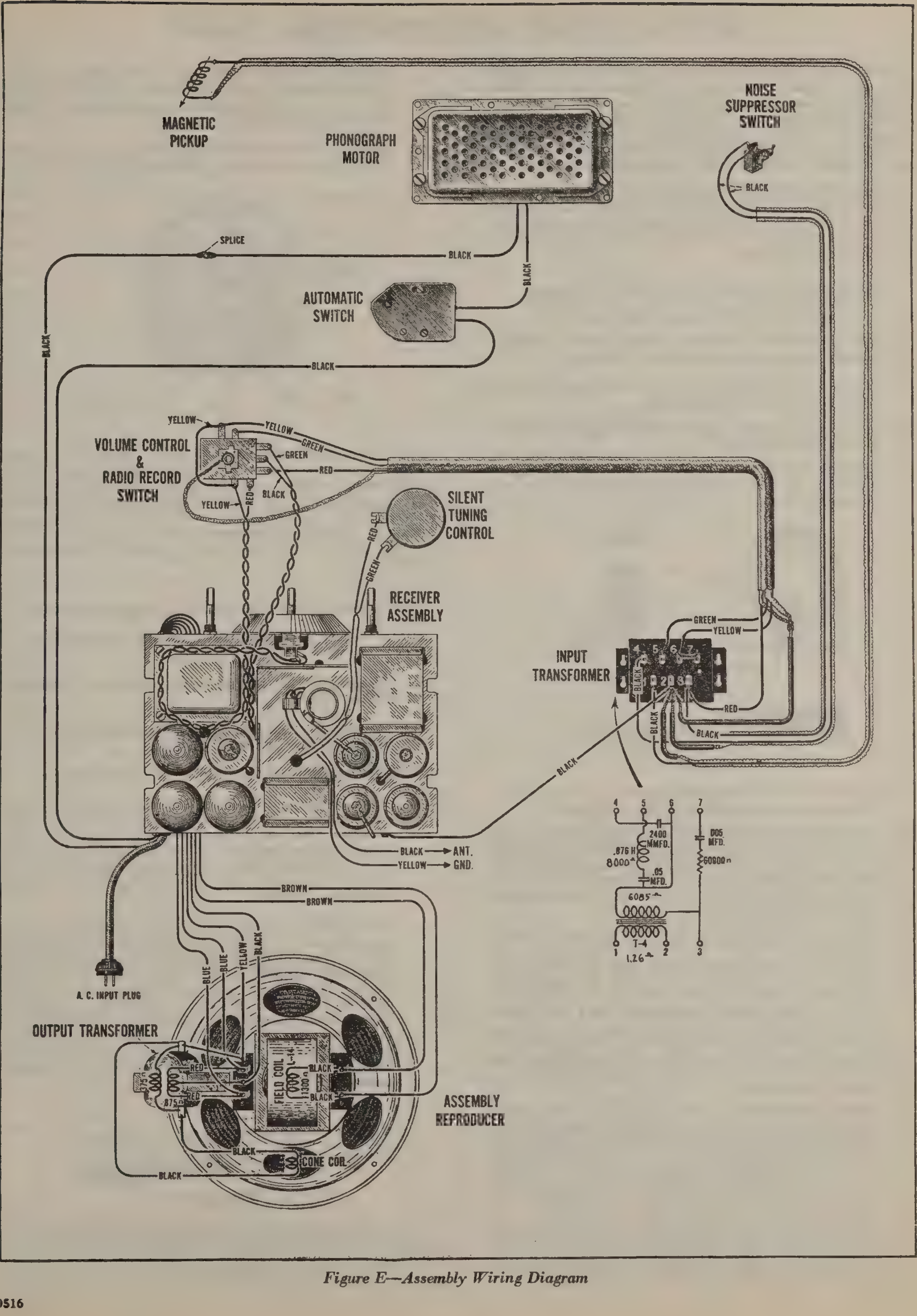


Figure E—Assembly Wiring Diagram

SERVICE DATA ON MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of the viscoloid damping block.

The use of the viscoloid damping block, which vibrates as a whole on the low frequencies, yet absorbs the armature vibration at the higher frequencies, eliminates any bad peaks in the frequency range. This pickup output is substantially flat from 50 to 5000 cycles.

REPLACING MAGNET COIL, PIVOT RUBBERS, ARMATURE OR DAMPING BLOCK

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

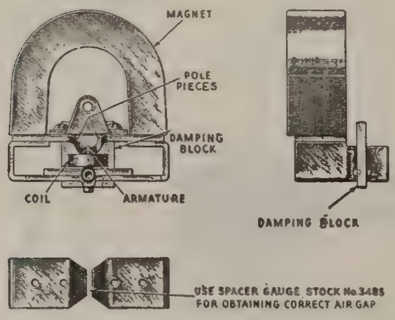

MAGNET
POLE PIECES
DAMPING BLOCK
COIL
ARMATURE
DAMPING BLOCK
USE SPACER GAUGE STOCK No.3485 FOR OBTAINING CORRECT AIR GAP

Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered, being careful not to use too much heat as damage to the viscoloid damping block may result.

(f) Before reassembling the pole pieces the air gap should be correctly set by use of a Spacer Gauge—Stock No. 3485. The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position, making sure that the viscoloid damping block is entirely free from touching any parts, including the cover.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

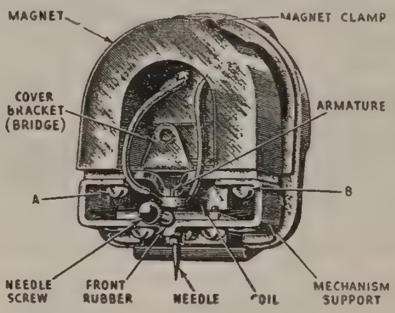


Figure G

In reassembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered. If the air gap is previously checked by means of Space Gauge, Stock No. 3485, no difficulty will be had in properly centering the armature.

REPLACING THE VISCOLOID DAMPING BLOCK

If it is desired to replace the viscoloid damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism frame.

(c) Remove the damping block from the armature.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the viscoloid in place. The iron should be applied long enough to slightly melt the viscoloid and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling of the viscoloid. The pickup should then be reassembled as described in the preceding section.

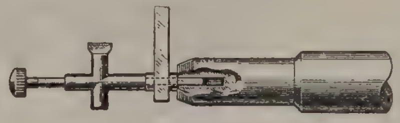


Figure H

Only rosin core solder should be used for any soldering in conjunction with the pickup. However if great care to wipe clean and use as small amount as possible is exercised paste or liquid flux may be used for soldering the end of the spring.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

RECEIVER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2746	Socket—Dial lamp socket	$0.20
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	.35
3003	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—½ watt—Carbon type—Package of 5	1.00
3252	Resistor—100,000 ohms—½ watt—Carbon type—Package of 5	1.00
3369	Resistor—4,500 ohms—Porcelain type—20 watt	.85
3449	Coil—Choke coil mounted on resistor board	1.12
3450	Capacitor—0.2 mfd. mounted on resistor board	.46
3451	Bracket—Dial lamp bracket and indicator—Package of 2	.38
3455	Capacitor—0.01 mfd.	.44
3456	Capacitor—0.05 mfd.	.44
3457	Resistor—Porcelain type—3,665 ohms—Tapped at 365 ohms	.78
3458	Resistor—2,800 ohms—Carbon type—½ watt—Package of 5	1.00
3459	Capacitor—80 mmfd. capacitor	.44
3460	Capacitor—1,200 mmfd. capacitor	.30
3468	Resistor—300 ohms—Flexible type—Package of 5	1.00
6142	Resistor—6,000 ohms—½ watt—Carbon type—Package of 5	1.00
6192	Spring—3 gang tuning capacitor drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—½ watt—Carbon type—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, tone control or volume control knob—Package of 5	1.00
6298	Cord—3 gang variable tuning capacitor drive cord—Package of 5	.60
6300	Socket—4 contact Radiotron socket	.35
6301	Reactor—Filter reactor	1.40
6303	Resistor—20,000 ohms—½ watt—Carbon type—Package of 5	1.00
6308	Coil—R. F. coil complete with mounting bracket	1.36
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
6367	Transformer—First intermediate frequency transformer	2.14
6368	Transformer—Second intermediate frequency transformer	2.14
6369	Volume control or silent tuning control—Complete with mounting nut	1.16
6370	Tone control—Complete with mounting nut	1.34
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable trimming capacitor—Capacity 15 to 70 mmfd.	.50
7065	Screw driver—Micarta screw driver for I. F., R. F. and oscillator condensers	.80
7439	Drum—Dial drum with 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7481	Coil—Detector and oscillator coil complete with mounting bracket	2.20
7484	Socket—UY type Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7501	Capacitor—3 gang variable tuning capacitor complete with mounting screws and washers	4.20
7510	Shield—Radiotron tube shield—Maroon finish	.30
7511	Shield—Radiotron tube shield top—Maroon finish	.25
7549	Transformer—Interstage audio transformer	2.48
7550	Capacitor pack—Comprising two 10.0 mfd., one 8.0 mfd., one 0.3 mfd., two 1.0 mfd., one 0.5 mfd., and three 0.1 mfd. capacitors in metal container—For 60 cycle operation	7.40
7551	Transformer—Power transformer—105–125 volts—50–60 cycles	6.40
7556	Transformer—Power transformer—105–125 volts—25–50 cycles	8.50
7564	Capacitor pack—Comprising two 10.0 mfd., two 8.0 mfd., one 0.3 mfd., one 4.0 mfd., one 0.5 mfd. and three 0.1 mfd. capacitors in metal container—For 25 cycle operation	7.24

MOTOR BOARD ASSEMBLIES

Stock No.	DESCRIPTION	List Price
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3391	Suspension spring and washer assembly for motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 1 "C" washer, 2 cup washers and 1 nut—1 set	.50
3396	Receptacle—Needle receptacle with mounting screws	.52

Stock No.	DESCRIPTION	List Price
3430	Box—Needle box with lid—Package of 2	$0.90
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
10635	Switch—Scratch filter switch—Toggle type	.90

PICKUP, PICKUP ARM ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—Package of 5 sets	1.10
3419	Screw—Pickup cover mounting screw—Package of 10	.50
3485	Tool—Pickup spacing tool	2.00
3516	Damper and bushing assembly—Located in bottom of pickup arm base	.14
3521	Cover—Magnetic pickup back cover	.18
6335	Pickup—Pickup unit complete	4.00
6346	Back—Pickup housing back	.45
7579	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	4.00

TURNTABLE ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3261	Bushing—Rubber bushing used on turntable spindle for long-playing Records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
8948	Turntable—Complete	5.50

MOTOR ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3398	Motor mounting washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
8939	Motor—Motor complete 105–125 volts—60 cycle	15.92
8940	Motor—Motor complete 105–125 volts—50 cycle	20.20
8941	Motor—Motor complete 105–125 volts—25 cycle	24.64
8942	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8943	Rotor and shaft for 105–125 volts 50 cycle motor	7.00
8944	Rotor and shaft for 105–125 volts, 25 cycle motor	9.00
8945	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.68
8946	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.68
8947	Spindle—Turntable spindle with fibre gear for 25 cycle motor	4.68

REPRODUCER ASSEMBLIES

Stock No.	DESCRIPTION	List Price
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—1 set	.50
6184	Board—Terminal board complete with 3 terminals—Package of 5	.50
6371	Transformer—Output transformer	1.90
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone complete with voice coil—Package of 5	6.35
9421	Coil assembly—Comprising field coil, magnet and cone support	4.32

MISCELLANEOUS PARTS

Stock No.	DESCRIPTION	List Price
3437	Knob—Selector switch and volume control knob	.60
6385	Volume control—Phonograph volume control and selector switch	2.02
6386	Cable—3 conductor shielded cable—From phonograph to volume control and input transformer pack	.70
7572	Transformer pack—Comprising input transformer, reactor, capacitors and resistor in metal container	4.42

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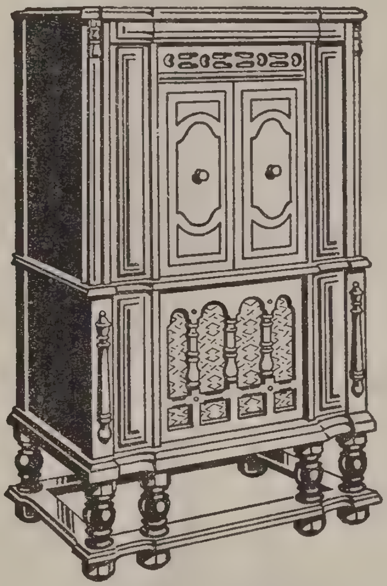
RCA Victor Company, Inc.
Camden, New Jersey, U. S. A.

Printed in U. S. A.

RCA Victor

Radiola Electrola, Model RE-81

SERVICE NOTES



RCA Victor RE-81

Fourth Edition—2M
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RCA Victor Company, Inc.

Camden, N. J., U. S. A.

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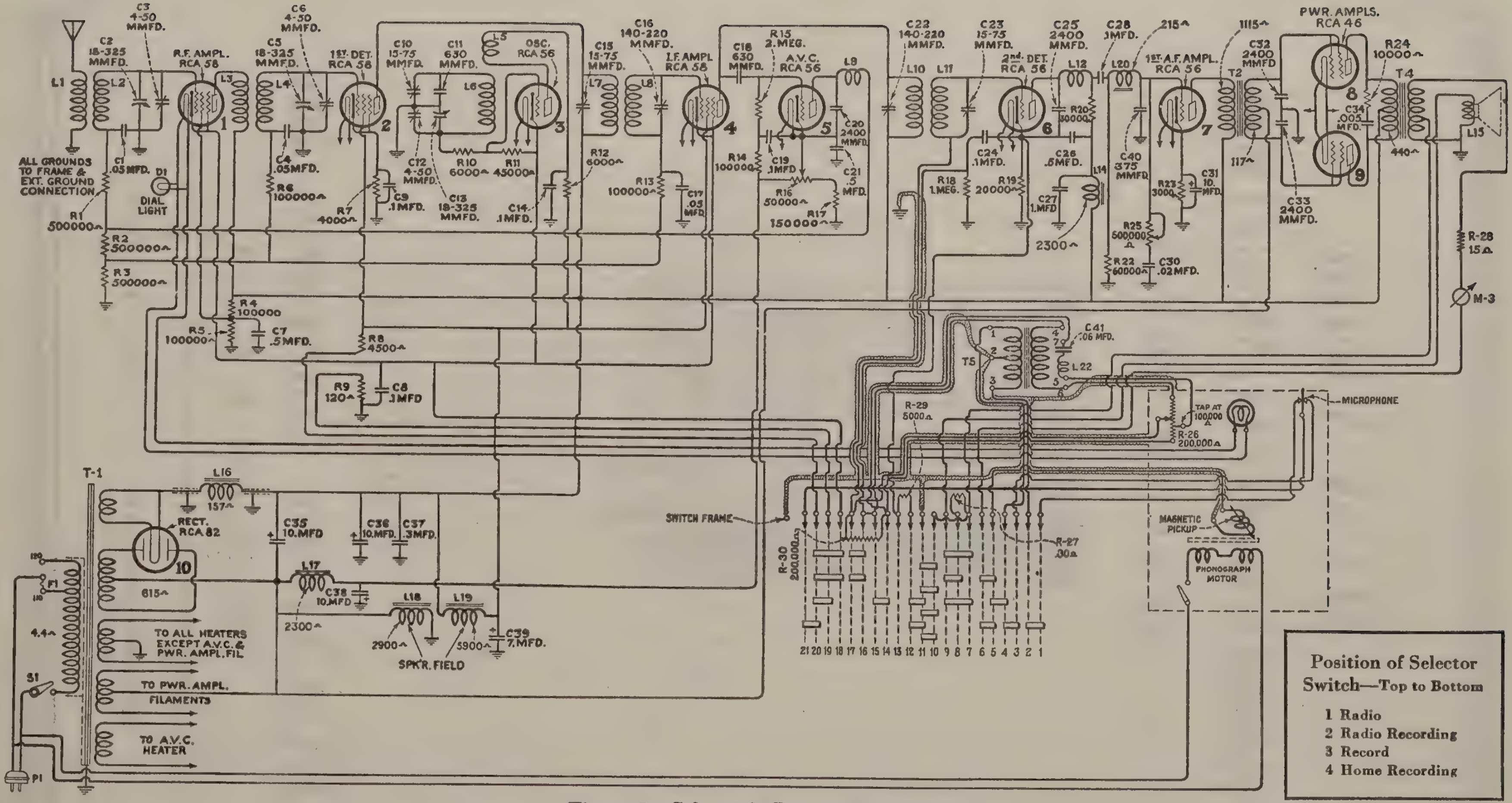


Position of Selector Switch—Top to Bottom

1 Radio
2 Radio Recording
3 Record
4 Home Recording

Figure 1—Schematic Diagram of RE-81

SERVICE NOTES
for
RCA Victor Model RE-81

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	25, 30, 50 and 60 Cycles
Power Consumption	25, 135 Watts; 30, 130 Watts; 50, 139 Watts; 60, 135 Watts
Recommended Antenna Length	25–100 Feet
Type of Circuit	Super-Heterodyne with A. V. C. and Class "B" Output Stage
Type and Number of Radiotrons	4 RCA-56, 3 RCA-58, 2 RCA-46, 1 RCA-82—Total 10
Number of R. F. Stages	One
Number of I. F. Stages	One
Number of A. F. Stages	Radio: Two, One Single and One Class "B" RCA-46 Record: Three, Two Single and One Class "B" RCA-46 Recording: Three, Two Single and One Class "B" RCA-46
Type of A. V. C.	RCA-56

Grid voltage supplied by output of I. F. Drop across resistor in plate circuit of A. V. C. constitutes bias voltage for R. F., 1st detector and I. F. Manual volume control adjusts grid bias of A. V. C. tube.

Type of Second Detector	Power Grid Bias
Type of Tone Control	Variable Resistor and capacitor for reducing high frequency output of driver A. F. stage
Type of Rectifier	Mercury Vapor Full Wave RCA-82
Undistorted Output	7.0 Watts
Type of Microphone	Carbon Two Button
Type of Phonograph Motor	Induction Running at Synchronous Speed
Diameter of Turntable	12 Inches
Turntable Speed	33⅓ and 78 R. P. M.
Type of Speed Reducer	Ball Bearing Giving Very Smooth Operation
Type of Pickup and Tone Arm	Low Impedance Pickup with Inertia Type Tone Arm

PHYSICAL SPECIFICATIONS

Height	43 Inches
Width	25⅞ Inches
Depth	15¼ Inches
Weight Alone	113 Pounds
Weight Packed for Shipment	158 Pounds

RCA Victor Radiola Electrola RE-81 is a ten tube Super-Heterodyne phonograph combination instrument using the chassis of Model R-76 and R-77. Features such as Class "B" output stage, tone chambers for eliminating cabinet resonance, automatic volume control, continuously variable tone control, ball bearing speed reducer for two-speed turntable operation and the sensitivity, selectivity and tone quality of RCA Victor receivers are included in Model RE-81. Also an improved type of home recording is incorporated in this model.

A reference to Service Notes of Models R-74, R-76 and R-77 will give the details of any service information necessary for Model RE-81. Figures 1, 2 and 3 show the schematic, wiring and assembly diagrams respectively.

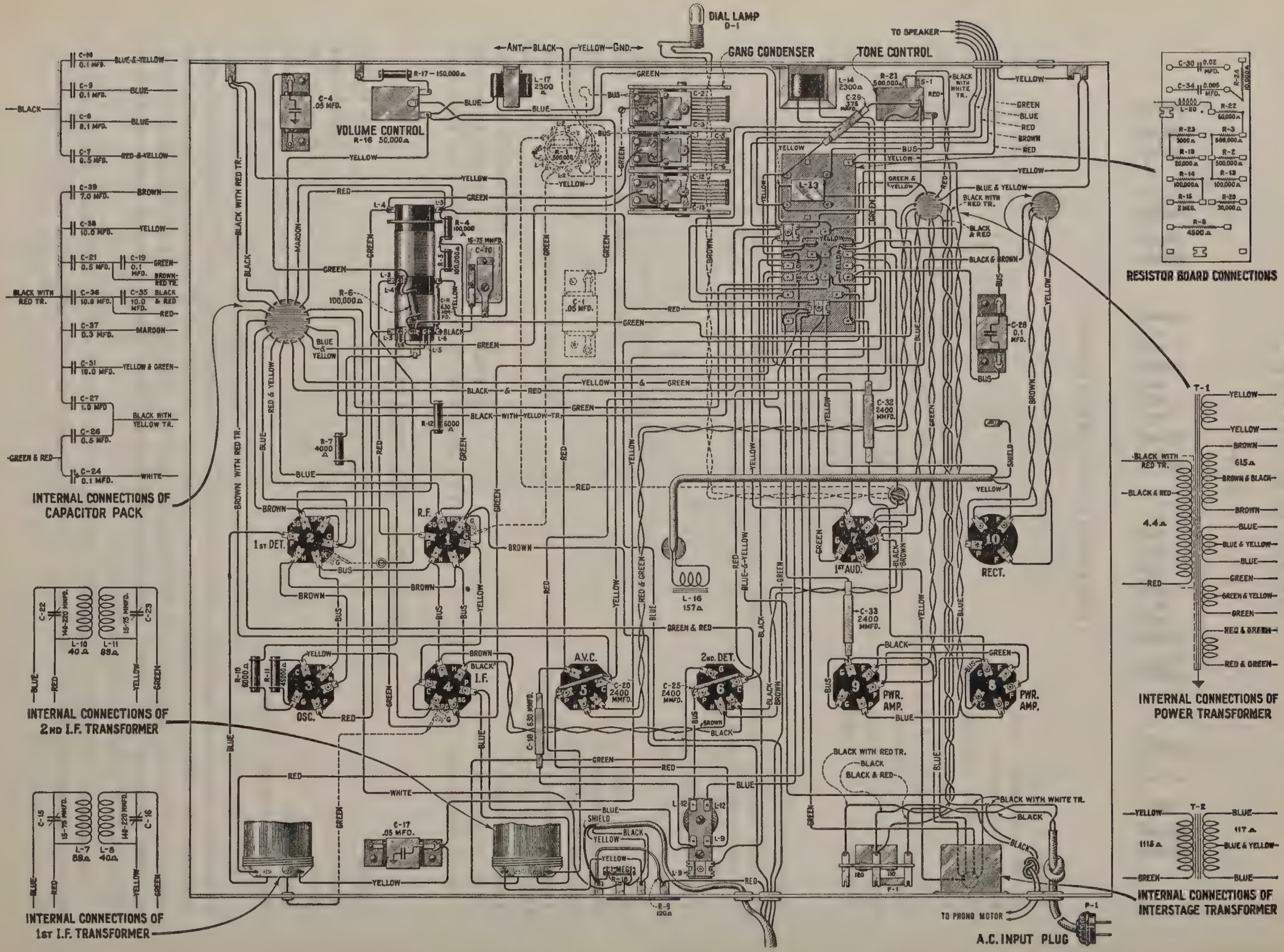


Figure 2—Wiring Diagram of RE-81 Receiver Assembly

RCA Victor RE-81

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2725	Fuse — 1.5 ampere — Cartridge type fuse—Package of 5	$0.40
2731	Resistor—10,000 ohms—Carbon type resistor—1 watt—Package of 5	1.10
2746	Socket—Dial lamp socket	.20
2747	Cap—Contact cap—Package of 5	.50
2749	Capacitor—2,400 mmfd. capacitor	.35
3048	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
3055	Cushion—Sponge rubber chassis cushion support—Package of 4	.30
3056	Shield—Radiotron tube shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt—Package of 5	1.00
3099	Capacitor—0.005 mfd. capacitor	.50
3252	Resistor—100,000 ohms—Carbon type resistor—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3359	Resistor—120 ohms—Flexible wire type—Package of 5	1.00
3360	Resistor—150,000 ohms—Carbon type—½ watt—Package of 5	1.00
3368	Socket—UX type Radiotron socket	.40
3369	Resistor—4,500 ohms—Porcelain type—20 watt	.85
3370	Capacitor—0.02 mfd. capacitor	.35
3372	Cover—Fuse cover	.40
3373	Board—Terminal board—1 terminal and insulator	.40
3374	Reactor—A. V. C. filter reactor	1.25
3375	Reactor—Tone compensating reactor	1.00
3376	Mounting board—Fuse mounting board complete with mounting screws and lock washers—Less fuse	.40
3377	Coil—Choke coil	1.00
3378	Capacitor — 375 mmfd. capacitor — Package of 5	1.50
3384	Capacitor—630 mmfd. oscillator series capacitor—Package of 5	1.50
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6186	Resistor—500,000 ohms—Carbon type—½ watt—Package of 5	1.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
6192	Spring—3-gang tuning capacitor drive cord tension spring—Package of 10	.30
6250	Resistor—4,000 ohms—Carbon type—½ watt—Package of 5	1.00
6277	Capacitor — 0.1 mfd. capacitor — Located on metal shield	.35
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Station selector, volume control or tone control knob—Package of 5	1.00
6298	Cord—3-gang tuning capacitor drive cord—Package of 5	.60
6302	Bracket—Dial lamp bracket and indicator—Package of 2	.32
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6308	Coil—R. F. coil complete with mounting bracket	1.36
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5	$1.00
6317	Capacitor—0.05 mfd. capacitor	.40
6322	Volume control—Complete with mounting nut	1.25
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
7054	Cord—Power cord	.60
7062	Capacitor—Adjustable tuning capacitor 15 to 70 mmfd.	.50
7439	Drum—Dial drum with set screws and 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7484	Socket—UY type Radiotron socket—6 used	.35
7485	Socket—6-contact socket—4 used	.40
7487	Shield—Radiotron tube shield—6 used—Plain finish	.25
7488	Shield—Tube shield top—1 used—Plain finish	.20
7501	Capacitor — 3-gang variable tuning capacitor complete with mounting screws and washers	4.20
7504	Coil—Detector and oscillator coil complete with mounting bracket	2.25
7510	Shield—Radiotron tube shield—6 used—Maroon finish	.30
7511	Shield—Radiotron shield top—1 used—Maroon finish	.25
7512	Reactor—Detector plate reactor	1.15
7513	Capacitor pack—Comprising five 0.1 mfd., three 0.5 mfd., one 7.0 mfd., four 10.0 mfd., one 0.3 mfd., and one 1.0 mfd. capacitors in metal container	8.60
7514	Transformer—1st intermediate frequency transformer	2.04
7515	Transformer — 2nd intermediate frequency transformer	2.00
7517	Shield—Metal shield—Located under power transformer and Radiotron RCA-82	.30
7518	Reactor—Filter reactor	2.30
7519	Transformer—Audio input transformer	2.35
7521	Reactor—Tone compensating reactor	1.10
7522	Tone control—Complete with mounting nut	1.30
7528	Cable—6 conductor shielded cable complete with terminal strip	1.20
8932	Transformer—Power transformer 105–125 volts—50–60 cycles	7.70
8933	Transformer—Power transformer 105–125 volts—25–50 cycles	9.45
9034	Transformer—Power transformer step-down—220–110 volts	4.00
	REPRODUCER ASSEMBLIES	
3237	Screw assembly—Comprising 4 screws, 8 nuts, 4 washers, and 4 eyelets—Package of 1 set	.50
6184	Board—Terminal board with 3 terminals—Package of 5	.50
6334	Transformer—Output transformer	2.80
8920	Ring—Cone retaining ring	.35
8935	Cone — Reproducer cone complete — Package of 5	5.25
9420	Coil assembly—Comprising field coil, cone bracket and magnet	4.64

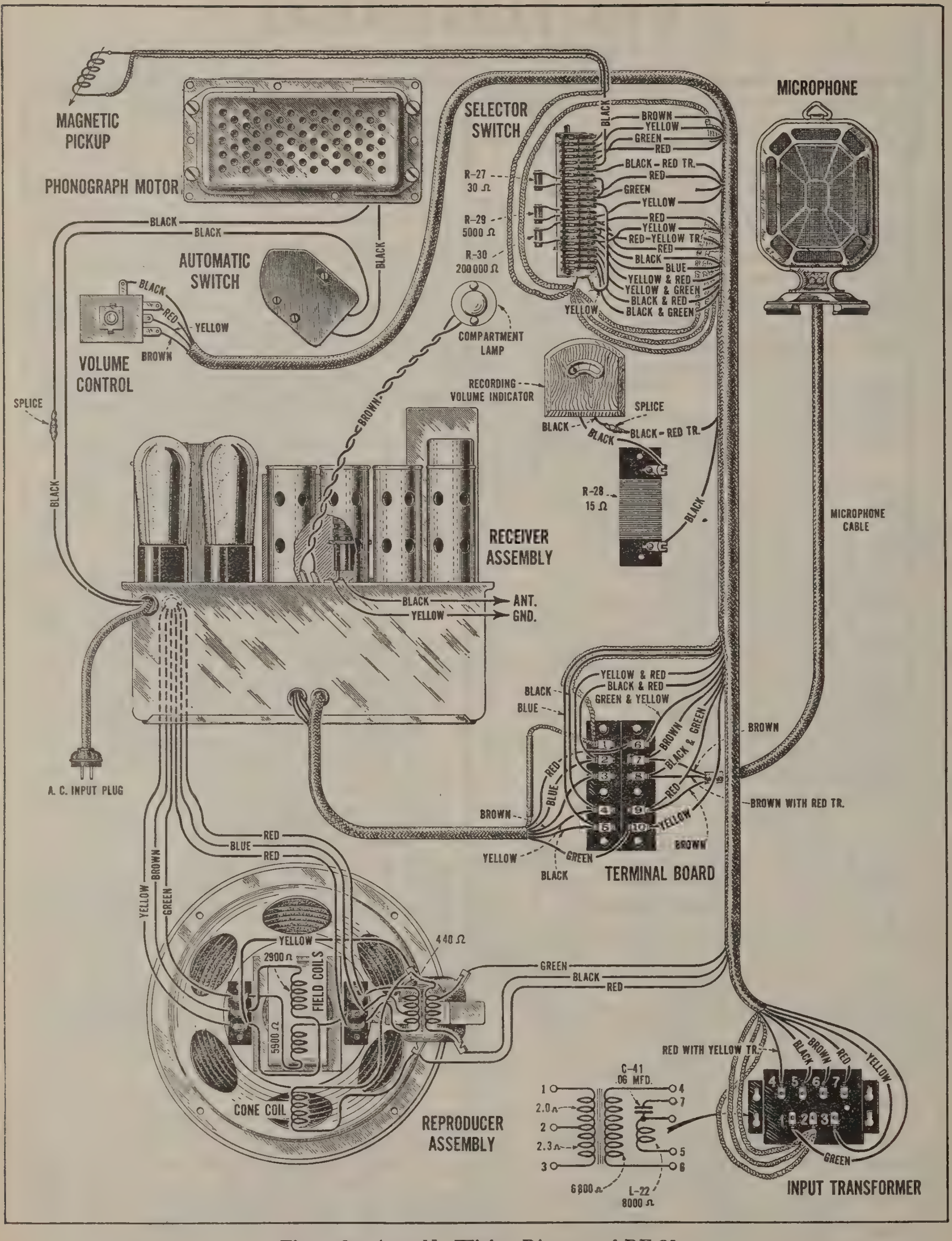


Figure 3—Assembly Wiring Diagram of RE-81

REPLACEMENT PARTS (Continued)

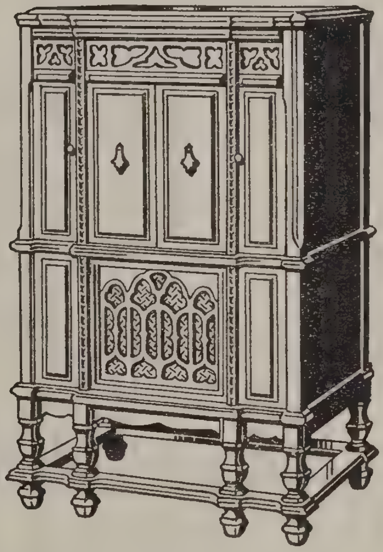
Stock No.	DESCRIPTION	List Price
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Selector switch pointer—Package of 10	$0.50
2947	Leather—Friction leather—Package of 20	.50
3021	Resistor—5,000 ohms—Carbon type—½ watt—Package of 5	1.00
3116	Resistor—200,000 ohms—Carbon type ½ watt—Package of 5	1.00
3322	Switch—Automatic brake switch with mounting screws	.75
3391	Suspension spring and washer assembly for motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 1 "C" washer, 2 cup washers and 1 nut	.50
3392	Spacer—Volume control spacer block	.35
3393	Spacer—Selector control switch spacer block	.30
3394	Socket—Socket and base assembly—Less shade—For compartment lamp	.72
3395	Shade—Compartment lamp shade	.36
3396	Receptacle — Needle receptacle with mounting screws	.52
3400	Resistor—30 ohms—Carbon type—¼ watt—Package of 5	1.00
3430	Box—Needle box with lid—Package of 2	.90
6288	Knob—Selector switch or volume control knob—Package of 5	1.00
6337	Volume control—Complete with mounting nut	1.60
6338	Switch—Selector control switch complete—Less knob	5.00
6339	Escutcheon—Selector switch escutcheon	.90
7529	Transformer pack—Comprising phonograph input transformer, reactor and capacitor assembly	4.50
7531	Cable—Selector switch, volume control, terminal strip, volume indicator meter phonograph input transformer and reproducer output transformer connecting cable	1.50
10174	Springs—Automatic brake springs—One set of 4 springs—Package of 2 sets	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40
	PICKUP, PICKUP ARM, MICROPHONE AND VOLUME INDICATOR ASSEMBLIES	
3216	Cushion—Microphone rubber cushions—Package of 6	.24
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly — Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
3397	Resistor—15 ohm—Flat type—Volume indicator meter series resistor	.52

Stock No.	DESCRIPTION	List Price
3417	Armature—Pickup armature	$0.72
3418	Cushions—Pickup rubber cushions—Comprising one damper and two spacer cushions and one damper bushing—Package of 5 sets	1.10
3419	Screw—Pickup cover mounting screw—Package of 10	.40
6335	Pickup—Pickup unit complete	4.00
6336	Weight—Home recording weight	1.20
6346	Back—Pickup housing back	.45
6460	Housing—Microphone housing	2.42
7530	Arm — Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	4.00
7532	Meter—Home recording volume indicator meter	2.50
7533	Mechanism — Microphone mechanism less housing	6.80
7534	Cord—Microphone cord	.70
	TURNTABLE ASSEMBLIES	
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove-Pin—Package of 2	.56
3342	Spring — Latch spring — Located on clamping ring—Package of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MOTOR ASSEMBLIES	
3261	Bushing—Rubber bushing used on turntable spindle for long-playing Records—Package of 5	.40
3398	Motor mounting washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer—Package of 1 set	.48
8939	Motor—Motor complete 105–125 volts—60 cycle	15.92
8940	Motor—Motor complete 105–125 volts—50 cycle	20.20
8941	Motor—Motor complete 105–125 volts—25 cycle	24.64
8942	Rotor and shaft for 105–125 volts, 60 cycle motor	9.00
8943	Rotor and shaft for 105–125 volts, 50 cycle motor	7.00
8944	Rotor and shaft for 105–125 volts, 25 cycle motor	9.00
8945	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.68
8946	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.68
8947	Spindle—Turntable spindle with fibre gear for 25 cycle motor	4.68

Printed in U. S. A

RCA Victor
Radiola Automatic Electrola
Model RAE-84

SERVICE NOTES



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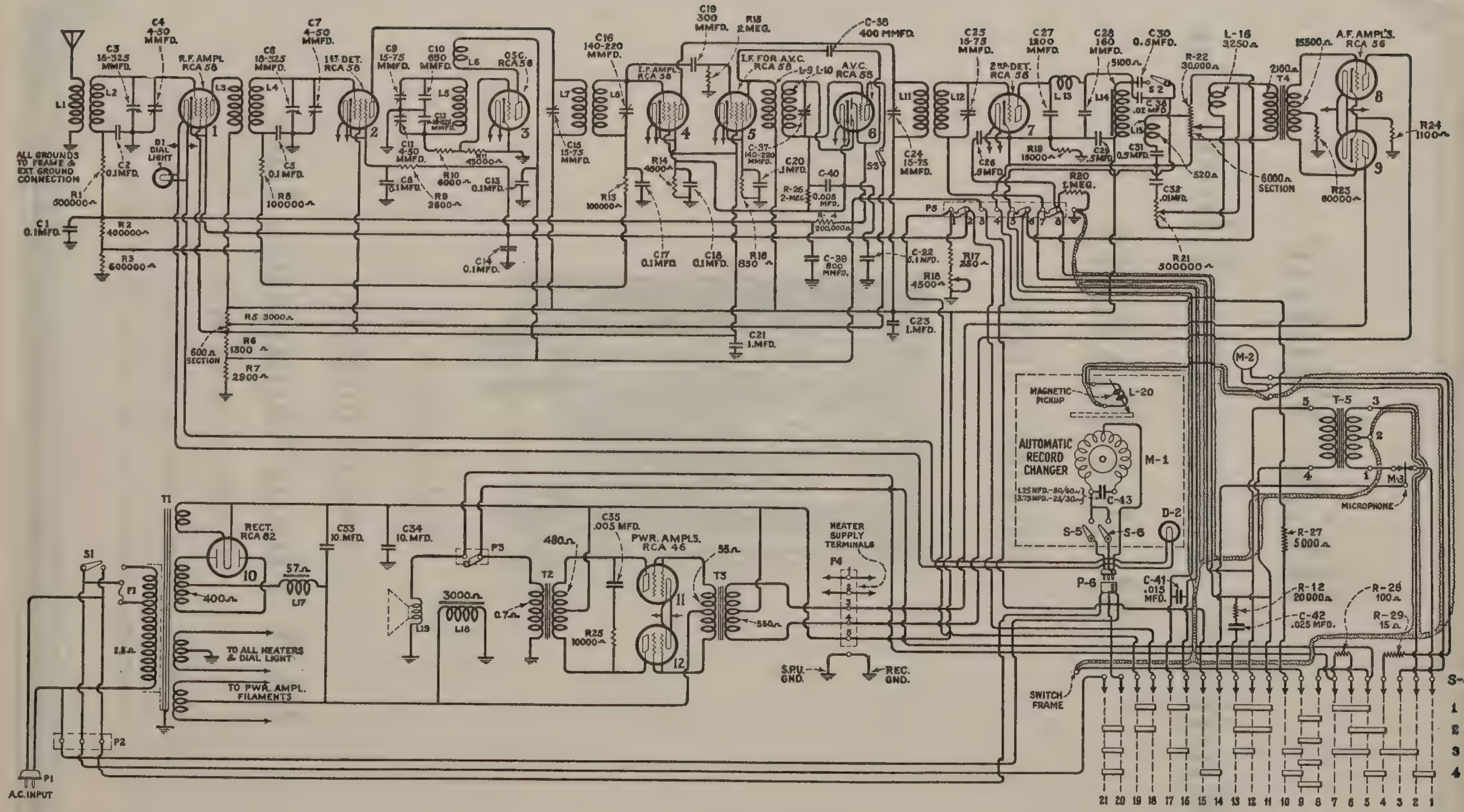

Figure 1—Schematic Wiring Diagram of RAE-84

RCA Victor RAE-84

(BI-ACOUSTIC PHONOGRAPH COMBINATION)

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Voltage Rating	105–125 Volts
Frequency Rating	50–60 Cycles
Power Consumption	130 Watts Average (The input wattage may vary from 90 to 150 watts, depending on the output volume being used)
Recommended Antenna Length	25–100 Feet
Type of Circuit	Super-Heterodyne with A. V. C., Compensated A. F. System, Class "B" Output Stage and Noise Suppressor
Type and Number of Radiotrons	1 RCA-55, 4 RCA-58, 4 RCA-56, 2 RCA-46, 1 RCA-82—Total 12
Number of R. F. Stages	One
Type of First Detector	Exponential with Control Grid Voltage by A. V. C. Tube
Number of Intermediate Stages	Two, One for Signal and One for A. V. C. and Noise Suppressor
Type of Second Detector	Power Grid Bias
Number of A. F. Stages	Radio: Two, One Push-Pull Driver and One Class "B" Output Record: Three, One Single, One Push-Pull Driver and One Class "B" Output Home Recording: Three, One Single, One Push-Pull Driver and One Class "B" Output
Type of Tone Control	Reactor Capacitor and Variable Resistor for Reducing High Frequency Response
Type of Rectifier	Mercury Vapor Full Wave RCA-82
Undistorted Output	Approximately 20 Watts Maximum
Type of Record Changer	Perfected RCA Victor Ten 10-Inch Record Continuous Type
Type of Pickup and Tone Arm	Low Impedance Pickup with Inertia Tone Arm
Type of Microphone	Two Button Carbon

PHYSICAL SPECIFICATIONS

Height	46 Inches
Width	29¼ Inches
Depth	20¾ Inches
Weight Alone	198 Pounds
Weight Packed for Shipment	263 Pounds

RCA Victor Radiola Automatic Electrola Model RAE-84 is a twelve tube Bi-Acoustic Radio Phonograph combination. A brief description of its four major functions follows:

Radio. The radio receiver, amplifier and loudspeaker are identical to those used in the famous RCA Victor R-78. This unit is characterized by its excellent performance in respect to sensitivity, selectivity and sensational tone quality. This latter feature is taken a step further in the RAE-84 due to the large area of the cabinet. This results in increased baffle area for the loudspeaker with the resulting greater and smoother low frequency response. A new feature of the RAE-84 is the inclusion of a noise suppression circuit in conjunction with the new Radiotron RCA-55. This feature eliminates background noises when tuning from station to station. The degree of suppression is adjustable by means of the sensitivity control.

Phonograph. The phonograph mechanism of the RAE-84 consists of the perfected RCA Victor continuous type record changing mechanism together with the low impedance pickup and tone arm. The output of the pickup is fed through the same amplifier and speaker as the radio receiver and gives an even greater degree of fidelity of reproduction. The automatic record changing mechanism is similar to that used in other RCA Victor combinations, but has a number of improvements.

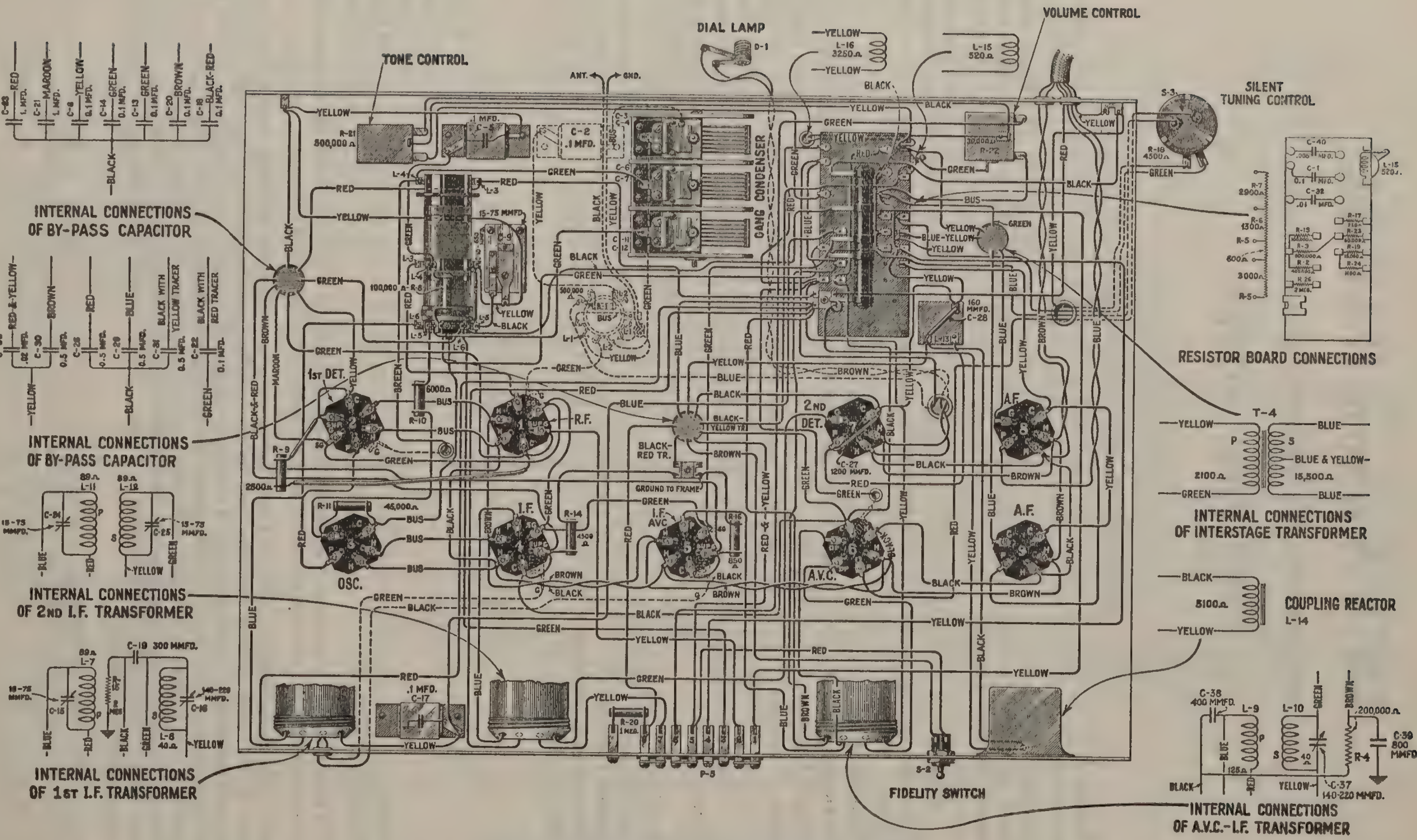

Figure 2—Receiver Wiring Diagram of RAE-84

These improvements are: turntable trip for manual operation that is operated by both concentric and eccentric groove records, 10-inch automatic trip for Brunswick and Columbia records that may be used to start and stop while playing manually by moving the tone arm, safety shift lever that prevents jamming while attempting to change from automatic to manual operation when the mechanism is in cycle and a record light to provide better illumination. The tone arm is mounted on rubber, which gives a greater degree of freedom from motor vibration.

Recording. Facilities of the RAE-84 make it the ideal instrument for home recording. This may be either voice, music or other sounds directed into the microphone or a radio program being broadcast on the air. The records so made are of practically studio quality. A feature of the home recording is the inclusion of a recording level meter which gives a visual indication of the output current so that the optimum value is used for making records. This gives a uniform quality to the records which heretofore has been impossible to maintain.

SERVICE DATA—RADIO

A reference to the R-78 Service Notes gives the details of any service data necessary in conjunction with this receiver. It will be noted that an additional terminal has been added to the terminal strip at the rear of the receiver chassis. This will be included in later models of the R-78 as well as all models of the RAE-84. Figures 1, 2 and 3 show the schematic, receiver wiring and amplifier diagrams respectively, while Fig. 5 shows the assembly wiring. The amplifier and loudspeaker are identical with those used in the R-78. The replacement parts are shown on pages 10 and 11.

Due to the use of the noise suppressor circuit, which is not included in the older models of the R-78, a brief description of the functioning of this circuit follows:

The function of the noise suppressor circuit is to reduce noise, by greatly decreasing the sensitivity of the receiver when no carrier waves are being received. A manually operated sensitivity control is also provided so that the overall sensitivity of the receiver may be adjusted, thereby eliminating the reception of signals having too great a noise level. This feature operates without introducing distortion, a quality not present in other type noise suppressor circuits.

A reference to the schematic diagram, Figure 1, will show the circuit used in conjunction with the Radiotron RCA-55 for obtaining the noise suppressor action.

The two channel intermediate amplifiers are similar in operation to the older model R-78, with one channel supplying the signal voltage to the second detector and the other supplying signal voltage to the A. V. C. and noise suppressor circuit.

The untuned intermediate I. F. transformer used in the older model R-78 has been changed to a natural period plate coil L-9 and a sharply tuned secondary coil L-10. Coil L-9 supplies the voltage to operate the A. V. C. circuit, while Coil L-10 supplies that used to operate the suppressor circuits. An examination of this circuit will show that with no signal voltage impressed on Coil L-10, no current is rectified in the Diode plate and hence the grid of the Radiotron RCA-55 operates at zero bias. The plate current is then at a maximum value—approximately 10 M. A.—and since the cathodes of the Radiotron RCA-55 and the signal channel I. F. tube are common, the I. F. tube is biased to cut-off. This, therefore, prevents signal voltage from reaching the second detector.

When the receiver is tuned to a signal, the signal voltage is amplified in the A. V. C. amplifier and impressed on coils L-9 and L-10.

On the positive half of the signal voltage, the signal is rectified in the suppressor circuit, which generates a negative potential on the grid of the Radiotron RCA-55. The plate current is thereby reduced to approximately zero, which releases the high bias potential on the signal channel I. F. amplifier. Signal voltage will then be impressed on the second detector.

A. V. C. bias for the R. F., first detector and I. F. tubes will be generated when the I. F. voltage on the A. V. C. Diode overcomes and exceeds the positive potential on the cathode of the Radiotron RCA-55. This bias is approximately 10 volts when the receiver is tuned to signal.

The second I. F. transformer feeding the second detector has been changed to two high impedance circuits in order to provide the proper amplification with the increased bias resistor in the I. F. cathode circuit.

The suppressor circuit L-10 has been designed to be a sharp circuit so that the action of the suppressor comes as near the center of the carrier as possible.

The sensitivity control is in the cathode circuit of the R. F. and first detector and reduces the sensitivity of the receiver by increasing the residual bias on these Radiotrons. One end of the sensitivity control has a switch which is provided so that the noise suppression circuit may be cut out. Under this condition, the full sensitivity of the receiver is obtained.

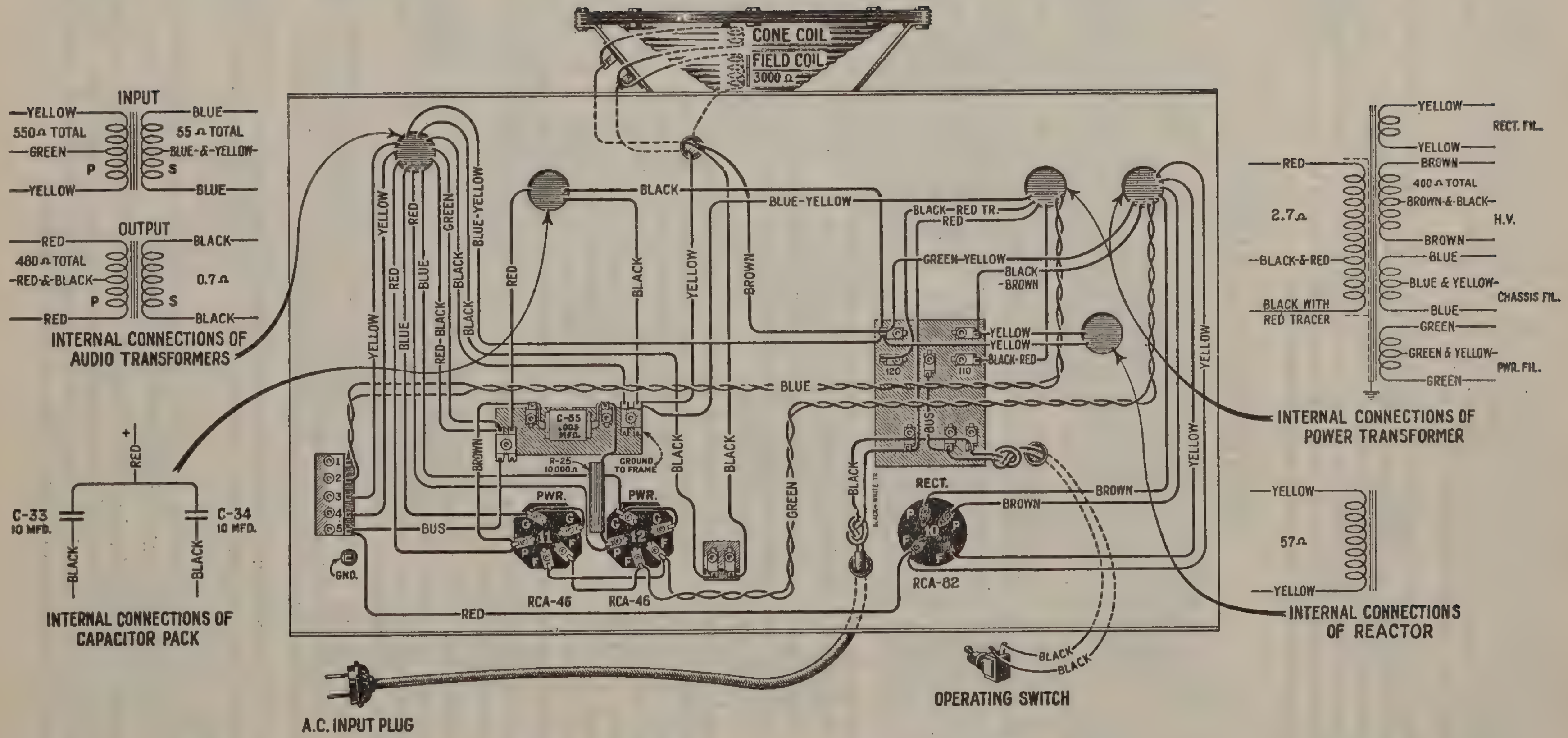

Figure 3—Amplifier Wiring Diagram of RAE-84

(1) I. F. TUNING ADJUSTMENTS

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only five of the circuits are tuned by adjustable capacitors and require adjustment. The coil used for the A. V. C. is broadly tuned and does not require any adjustment, while the one used for the noise suppressor circuit is sharply tuned. Refer to Figure 4 for location of the adjusting screws.

The transformers are all tuned to 175 K. C., and adjustments are made for maximum output.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, or a low range A. C. voltmeter connected across the reproducer unit cone coil.

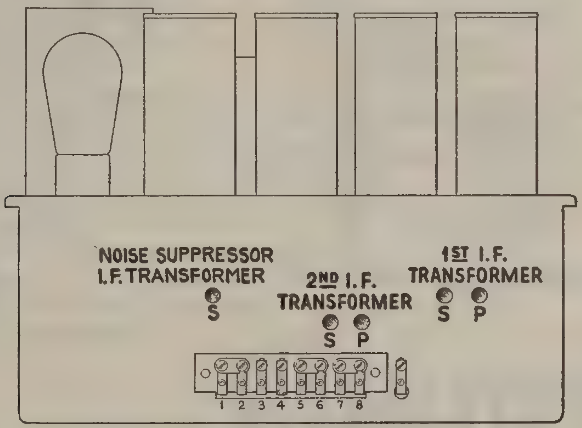

Figure 4—Location of I. F. Capacitors

(c) Remove the oscillator tube and make a good ground connection to the chassis. Place the test oscillator in operation and couple its output from the control grid of the first detector to ground. With the receiver volume control at maximum, the noise suppressor control at its extreme counter-clockwise position and the noise suppressor switch open, adjust the oscillator output until a deflection is obtained in the output meter.

(d) Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time, as a slight readjustment may be necessary.

(e) Then close the noise suppression control switch by advancing slightly clockwise, but do *not* advance the control beyond the snapping of the switch. The single noise suppressor circuit should then be adjusted for maximum output.

The points to remember when making these adjustments are that no dummy Radiotron is used and a minimum of input signal is necessary. An excessive signal will make it impossible to get correct adjustments of the signal channel I. F. and especially the suppressor circuit.

It is necessary, when adjusting the suppressor circuit, that the input signal be kept just as low as possible so that the output meter follows every change in the adjustment of the suppressor I. F. circuit.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the R-78 Service Notes.

(2) RADIOTRON SOCKET VOLTAGES

Due to the wide variation in Set Analyzers, the RCA Victor Company will, in the future, list the actual voltages at which the Radiotrons operate, rather than those that will be obtained with a particular Set Analyzer. It is therefore necessary that the serviceman allow corrections for circuits having high resistance and for meter scales having a relative low resistance. Usually an application of Ohms Law will give an approximate value of the voltage that will be read on a particular meter, assuming that the resistance of the meter is known.

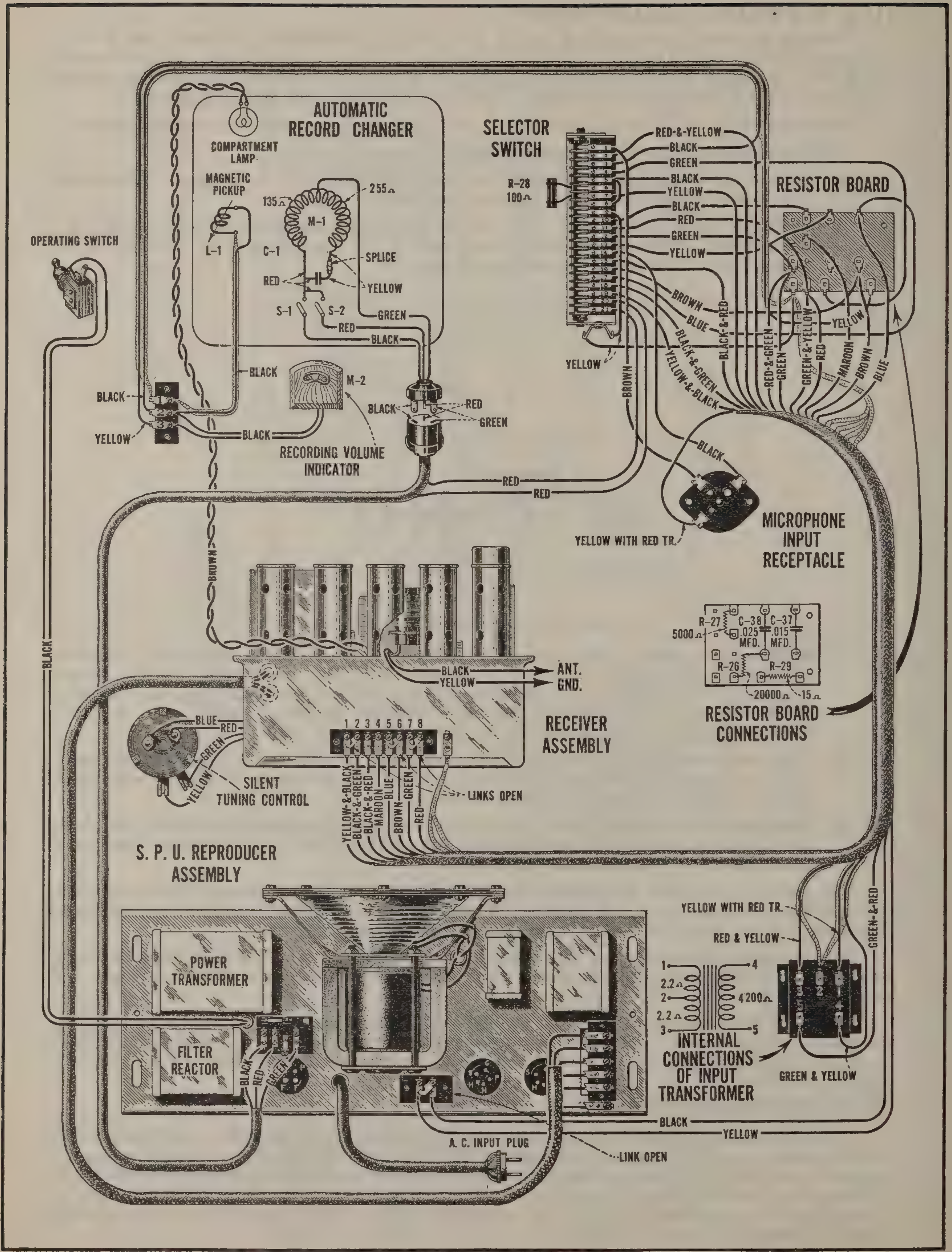

Figure 5—Assembly Wiring Diagram of RAE-84

RADIOTRON SOCKET VOLTAGES

120 Volt Line—Fuse at 120 Volt Tap—Antenna Shorted to Ground—No Signal

Radiotron No.	Cathode or Filament to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts D. C.	Diode Plate No. 1 to Cathode Volts, D. C.	Diode Plate No. 2 to Cathode Volts, D. C.	Plate Current M. A.	Heater or Filament Volts, D. C.
1. RCA-58—R. F.	— 3.5	106	212	—	—	6.5	2.5
2. RCA-56—Osc.	—	—	65	—	—	4.5	2.5
3. RCA-58—1st Det.	— 9	101	206	—	—	1.8	2.5
4. RCA-58—I. F.	—12	98	203	—	—	2.0	2.5
5. RCA-58—A. V. C. I. F.	— 5	106	210	—	—	4.0	2.5
6. RCA-55—A. V. C. Sup. (Sensitivity Control at Minimum)	0	—	0	0	—12	0	2.5
6. RCA-55—A. V. C. Sup. (Sensitivity Control at Maximum)	0	—	69	0	36	8.0	2.5
7. RCA-56—2nd Det.	—15	—	200	—	—	1.0	2.5
8. RCA-56—Driver	—11	—	204	—	—	5.0	2.5
9. RCA-56—Driver	—11	—	204	—	—	5.0	2.5
10. RCA-46—Power	0	0	400	—	—	6.0	2.5
11. RCA-46—Power	0	0	400	—	—	6.0	2.5
12. RCA-82—Rectifier	462.5 Volts R. M. S. Each Plate—72 M. A. Total Plate Current.						

SERVICE DATA—AUTOMATIC MECHANISM

The automatic mechanism used in the RAE-84 is similar to that used in other RCA Victor automatic combinations such as Models RAE-26, 59, or 79. Several minor changes have been made in these machines as follows:

1. Concentric Groove Trip. A trip so that either Brunswick or Columbia records may be mixed with Victor records in the automatic magazine has been provided.

2. An automatic starting switch, operated by pulling the tone arm to the right, has been added for manual playing.

3. A trip to stop the motor when playing either 10- or 12-inch records manually has been added.

4. An interlock has been provided so that the manual lever cannot be moved while the mechanism is in cycle. This prevents jamming due to improper operation.

5. A ball race speed reducer is used for changing the turntable speed from 78 to $33\frac{1}{3}$ R. P. M. This is simple in operation and gives a greater freedom from "wows" than the gear type reducers.

6. Needle Lamp. A small electric lamp is provided so that proper illumination of the record and pickup is obtained. This assists in properly inserting the needle into the pickup as well as lowering the needle onto the record.

Service in conjunction with this mechanism will therefore be practically the same as that of the older type automatic record changing mechanims. However, due to the new trips several additional adjustments are now included.

(1) ADJUSTMENT OF AUTOMATIC SWITCH

The automatic switch should be adjusted so that the contacts are at least 0.025 inches apart when the switch mechanism has been tripped. This is important, as otherwise arcing at the switch may occur.

(2) ADJUSTMENT OF 10-INCH AUTOMATIC SPIRAL GROOVE TRIP LEVER

The 10-inch automatic spiral groove trip lever should be adjusted by means of the screw assembled thereon. Proper adjustment is obtained when it forces the four finger lever out of contact with the clutch pawl, which trips the mechanism, when the needle is between a $1\frac{27}{32}$ inch and a $1\frac{7}{8}$ inch radius from the center of the turntable spindle.

(3) ADJUSTMENT OF 12-INCH AUTOMATIC SPIRAL GROOVE SWITCH

The 12-inch automatic spiral groove switch should be adjusted by means of the adjusting screw assembled in the trip lever so that it forces the switch lever out of contact with the switch trip lever, causing the latter to open the switch when the needle is between a $1\frac{27}{32}$ inch and a $1\frac{7}{8}$ inch radius from the center of the turntable spindle.

(4) LUBRICATION

The mechanism will seldom require lubrication. The motor gears run in grease. Unless gear replacements are made, it should not be necessary to relubricate this section. RCA Victor motor oil should be placed in the oil wells at each end of the motor occasionally. Wicks in these wells hold sufficient oil for normal operation from six months to one year. Oil should also be placed on the gear bearings, visible when the turntable is removed, and on the elevator shafts. RCA Victor motor grease should be placed on the slide and the mechanism gears once every six months.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2723	Switch—Fidelity switch—Package of 5	$3.00
2746	Socket—Dial lamp socket	.20
2747	Contact cap—Package of 5	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3055	Cushion—Sponge rubber chassis support cushions—Package of 4	.30
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3437	Knob—Noise suppressor rheostat knob	.60
3439	Resistor—600,000 ohms—Carbon type—1 watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3441	Resistor—850 ohms—Carbon type—½ watt—Package of 5	1.00
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6188	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
6189	Bracket—Dial lamp bracket and indicator—Package of 2	.46
6192	Spring—3-gang tuning capacitor drive cord tension spring—Package of 10	.30
6251	Capacitor—1,200 mmfd.—Package of 5	2.30
6276	Tone control—Complete with mounting nut and washer	1.40
6277	Capacitor—0.1 mfd. capacitor—Located in back of oscillator tube socket	.35
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6284	Reactor—Tone control reactor	1.00
6285	Choke coil—Second detector plate choke coil	.72
6288	Knob—Station selector, tone control, radio or phonograph, volume control knob—Package of 5.	1.00
6298	Cord—3-gang tuning capacitor drive cord—Package of 5	.60
6308	Coil—R. F. coil complete with mounting bracket	1.36
6312	Capacitor—650 mmfd.—Oscillator series—Package of 5	1.50
6314	Capacitor—160 mmfd.—Package of 5	2.00
6315	Resistor—45,000 ohms—Carbon type—½ watt—Package of 5	1.00
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	1.00
6323	Shaft—Tuning condenser drive shaft with one flat washer and two "C" washers—Package of 2	.20
6351	Resistor—Voltage divider resistor	1.00
6352	Transformer—Third intermediate tranformer	2.35
6353	Transformer—Second intermediate transformer	2.35
6354	Rheostat—Noise suppressor rheostat	1.30
6355	Volume control—Complete with mounting nut	1.45
6356	Capacitor—0.1 mfd. capacitor—Located on resistor board	.40
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7298	Capacitor—0.01 mfd. capacitor—Located on resistor board	.40
7438	Capacitor—3-gang variable tuning capacitor complete with mounting screws and washers	4.40
7439	Drum—Dial drum with set screws and 3 dial mounting nuts	.35
7440	Scale—Dial and dial scale	.50
7477	Capacitor pack—Comprising two 1.0 mfd. and five 0.1 mfd. capacitors in metal container	2.25
7478	Capacitor pack—Comprising four 0.5 mfd., one 0.02 mfd., and one 0.1 mfd. capacitors in metal container	2.20
7479	Transformer—Interstage audio transformer in metal container	$3.25
7480	Transformer—First intermediate frequency transformer	2.15
7483	Reactor—Compensating reactor	.68
7484	Socket—UY type Radiotron socket—4 used	.35
7485	Socket—Radiotron 6-contact socket—5 used	.40
7486	Board—Phonograph terminal board—8 terminals and 3 links	.50
7498	Reactor—Coupling reactor	2.05
7500	Cable—6-conductor—From receiver to S. P. U.	.90
7504	Coil—Detector and oscillator coil complete with mounting bracket	2.25
7505	Shield—Tube shield top—1 used—Maroon	.25
7506	Shield—Radiotron tube shield—7 used—Maroon	.30
	AMPLIFIER ASSEMBLIES	
2725	Fuse—1.5 ampere—Cartridge type fuse—Package of 5	.40
2731	Resistor—10,000 ohms—1 watt—Carbon resistor—Package of 5	1.10
3032	Socket—UX type Radiotron socket with insulator	.30
3056	Shield—Radiotron tube shield—Package of 2	.40
3099	Capacitor—0.005 mfd. capacitor	.50
3147	Cover—Fuse cover with bushing and insulator	.60
6289	Strip—Terminal strip—5 terminals	.45
6290	Board—Terminal board complete with terminals, fuse clips, and insulator	.65
6291	Board—Terminal board complete with terminals and insulator—Less capacitor	.50
6292	Switch—Operating switch	1.00
7054	Cord—Power cord	.60
7370	Cover—Terminal strip cover with insulator—5 terminals	.20
7491	Socket—UY type Radiotron socket with insulator	.35
7578	Capacitor—.05 mfd.—Buffer capacitor	1.04
8910	Capacitor pack—Comprising two 10 mfd. capacitors in metal container	4.10
8911	Reactor—Filter reactor	3.15
8912	Transformer—Audio transformer pack comprising input and output transformer in metal container	4.36
8913	Transformer—Power transformer—105–125 volts, 50–60 cycles	8.65
8914	Transformer—Power transformer—105–125 volts, 25–50 cycles	10.28
8915	Transformer—Power transformer—200–250 volts, 50–60 cycles	8.40
10907	Fuse—3 ampere fuse (for 25 cycle use)—Package of 5.	.50
	REPRODUCER ASSEMBLIES	
7292	Screw assembly—Comprising two screws, two nuts, two lock washers, and one plate—For mounting speaker to amplifier	.40
8559	Ring—Cone retaining ring	.25
8916	Cone—Reproducer cone complete with voice coil—Package of 5	8.25
9418	Coil assembly—Comprising field coil, magnet, and cone support	9.50
	AUTOMATIC RECORD CHANGING MECHANISM ASSEMBLIES	
2893	Spring—Eccentric and spiral trip lever tension spring—Package of 10	.30
2894	Pulley—Cable pulley complete with mounting stud—Mounted horizontally—Package of 5	.50
2896	Spring—Cable lever adjustment spring—One end fastened to adjustment stud—Package of 10	.30
2898	Screw and nut—Elevator shaft adjustment—Package of 10	.50
2904	Lever—Front elevator actuating lever	.30
2905	Screw—Gear and bracket mounting screw—Package of 10	.40
2906	Spring—Check lever spring—Package of 10	.40
2907	Screw—Gear and ratchet set screw—Package of 10	.40
2909	Spring—Four finger lever spring—$\frac{11}{16}$″ long—Package of 10	.50
2910	Spring—Four finger extension lever tension spring—$1\frac{7}{16}$″ long—Package of 10	.50
2911	Screw—Slide bracket mounting screw—Package of 10.	.30
2912	Roller—Slide roller complete with screw and stud—Package of 5	.75
2913	Spring—Cable lever tension spring—Package of 10	.50
2914	Spring—Flat spring and screw for locating lever—Package of 10	.80

REPLACEMENT PARTS—(Continued)

Insist on genuine factory teste dparts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
2916	Plate—Four finger lever and motor switch latch plate with mounting screws—Package of 5	$0.60
2917	Washer—Spring "C" washer for locating cable, four finger levers and manual index levers—Package of 10	.25
2918	Spring—Locating and extension lever tension spring—Package of 10	.40
2919	Screw and nut—Locating lever stop screw with nut—Package of 10	.40
2920	Washer—Friction washer for slide and elevator actuating lever—Package of 10	.25
2929	Lever—Rear elevator actuating lever—Package of 2.	.30
3200	Shaft—Front or rear elevator shaft	.60
3214	Pulley—Cable pulley with mounting stud—Mounted vertically—Package of 5	.50
3217	Lever—Check lever	.30
3322	Switch—Motor switch complete	.75
3401	Spring—Automatic trip lever tension spring—Package of 10	.50
3402	Screw—Elevator pad screw—Package of 10	.60
3403	Spring—Clutch pawl spring—Package of 10	.50
3404	Spring—Brake lever tension spring—Located on motor starting switch plate—Package of 10	.50
3508	Stud assembly—Four finger lever mounting stud, washer and nut assembly	.15
6340	Lever—Automatic trip lever	.55
6341	Lever—Manual index lever	.55
6342	Pawl—Clutch pawl complete	1.12
6343	Gear—Gear and ratchet with set screw	2.10
6344	Lever—Eccentric and spiral trip lever complete—For manual position	1.15
7186	Gear—Gear and bracket	1.40
7188	Bracket—Slide bracket with roller	1.00
7189	Lever—Front and rear elevator cam lever—Package of 5	1.50
7190	Lever—Locating lever	.60
7191	Lever—Cable lever	.40
7192	Cam—Cam gear and cam	1.10
7321	Lever—Tone arm cable guide lever with pulley	.60
7363	Pad—Front elevator rubber pad—Package of 10	2.00
8646	Slide	2.20
8647	Lever—Four finger lever	1.20
	MOTOR BOARD ASSEMBLIES	
2779	Pointer—Selector switch pointer—Package of 10	.50
3262	Screw and nut—Record transfer lever adjusting screw and nut—Package of 10	.40
3394	Socket and base assembly—For compartment lamp	.72
3395	Shade—Compartment lamp shade	.36
3405	Spring—Record transfer lever spring—Package of 10.	.40
3406	Escutcheon—Engraved "AUTOMATIC"	.36
3407	Escutcheon—Engraved "MANUAL"	.36
3408	Escutcheon—Engraved "33—78⅓"	.40
3409	Post—Roller post assembly for supporting record magazine	.60
3410	Suspension spring and washer for motor board—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 "C" washer and 1 nut	.50
3431	Escutcheon—Selector switch escutcheon	.80
6288	Knob—Selector control switch knob—Package of 5.	1.00
6345	Lever—Record transfer lever assembly complete	1.15
7535	Switch—Selector control switch complete, less knob and escutcheon	4.80
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing for turntable spindle—Long-playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3411	Sleeve—Sleeve assembly complete with ball race	2.85
3570	Cap—Spindle nose cap and spring	.30
8950	Turntable—Turntable complete	6.50
	MAGAZINE ASSEMBLIES	
2900	Screw—Magazine lever set screw—Package of 10	.50
3210	Lever—Magazine lever	.50
6172	Washer—Metal washer located under record magazine—Package of 20	.40
8951	Magazine—Record magazine	3.36
	PICKUP, ARM, MICROPHONE AND VOLUME INDICATOR ASSEMBLIES	
3183	Socket—Microphone socket—Package of 5	1.00
3204	Cable—Pickup arm cable—Package of 5	.80
3215	Plug—Microphone cord plug	.40
3216	Cushion—Microphone rubber cushion—Package of 6.	.24
3385	Coil—Pickup coil	.50
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly, comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw	.60
3389	Rod—Automatic brake trip rod with lock nut—Package of 5	.40
3390	Escutcheon—Pickup arm escutcheon complete with mounting rivets	$0.46
3412	Board—Volume indicator meter and pickup terminal board	.52
3417	Armature—Pickup armature	.72
3418	Cushions—Pickup rubber cushions—Comprising one damper, two spacer cushions and 1 damper bushing—Package of 5 sets	1.10
3419	Screw—Pickup cover mounting screw—Package of 10.	.40
6335	Pickup—Pickup unit complete	4.00
6336	Weight—Home recording weight	1.20
6346	Back—Pickup housing back	.45
7532	Meter—Home recording volume indicator meter	2.50
7533	Mechanism—Microphone mechanism—Less housing.	6.80
7534	Cord—Microphone cord	.70
7538	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw and washer	4.00
	MOTOR ASSEMBLIES	
3398	Motor mounting washer assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer—One set.	.48
6389	Capacitor—2.0 mfd. for motor No. 56933-G1	1.48
6410	Capacitor—2.5 mfd.—For motor No. 56933-G2	1.56
7330	Capacitor—Motor capacitor—3.75 mfd.—For 25 cycle operation	2.16
8644	Capacitor—Motor capacitor—1.25 mfd.—For 60 cycle motor 57085-2	1.10
8952	Motor—Motor complete—105–125 volts—60 cycles	35.40
8953	Motor—Motor complete—105–125 volts—25 cycles	41.16
8954	Motor—Motor complete—105–125 volts—50 cycles	37.50
8955	Rotor and shaft for 60 cycle motor No. 57085-G 2	9.00
8956	Rotor and shaft for 50 cycle motor No. 56212-G 2	9.00
8957	Rotor and shaft for 25 cycle motor	9.00
8958	Spindle—Turntable spindle with fibre gear for 60 cycle motor No. 57085-G 2	4.68
8959	Spindle—Turntable spindle with fibre gear for 50 cycle motor.No. 56212-G 2	4.68
8960	Spindle—Turntable spindle with fibre gear for 25 cycle motor	4.68
8971	Rotor and shaft for 60 cycle motor No. 56933-G1	9.00
8972	Spindle—Turntable spindle with fibre gear for motor No. 56933-G1	4.68
8973	Spindle—Turntable spindle with fibre gear for motor No. 56933-G2	4.68
8974	Rotor and shaft for 50 cycle motor No. 56933-G2	9.00
	MISCELLANEOUS PARTS	
2737	Escutcheon—Operating switch escutcheon—Package of 5	.40
2857	Plug—Three prong (male section) connector plug for power cable	.70
3173	Plug—Three prong (female section) connector plug for power cable	.90
3413	Resistor—5,000 ohms—Carbon type—½ watt—Package of 5	1.00
3414	Resistor—15 ohms—Porcelain type—20 watt	.88
3415	Receptacle—Needle receptacle	.52
3416	Box—Needle box with lid	.50
3433	Capacitor—0.015 mfd.	.35
3442	Resistor—100 ohms—Carbon type—½ watt—Located on selector switch—Package of 5	1.00
6292	Switch—Operating switch—Toggle type located on side of cabinet	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Package of 5	1.00
6348	Cable—Power three conductor power cable	1.65
6349	Cable—Shielded two conductor cable—From selector switch and resistor board to indicator meter and pickup terminal board	.40
7312	Transformer—Phonograph input transformer	6.00
7362	Capacitor—0.025 mfd.	.35
7536	Cable—Braid covered interconnecting cable from receiver terminal strip to phonograph input transformer, S. P. U. terminal strip, selector switch and resistor board assembly	1.20
	CABINET ASSEMBLIES (PRICES FURNISHED UPON REQUEST)	
2776	Catch assembly—Door catch and strike with nails	
6294	Hinges—Door hinges—One set of 4 hinges with mounting screws	
8949	Board—Motor board, less equipment	
X161	Panel—Control panel	
X162	Grille	
X163	Lid—Cabinet lid	
X164	Leg—Cabinet leg	
X165	Foot—Cabinet foot	
X166	Doors—Record compartment—One pair	
X167	Baffle board and grille cloth	
X168	Escutcheon—Station selector escutcheon	
X169	Support—Lid support with mounting screws	
X170	Doors—Cabinet center doors—One pair	
X171	Knob—Record compartment door knob with mounting screw	
X172	Pull—Door pull with mounting screw	
X173	Hinge—Lid hinge with mounting screw—Package of 2	

Printed in U. S. A.

Instructions for

RCA Victor R-90

Bi-Acoustic Superheterodyne with Tonalite Control

INTRODUCTION

This ten-tube superheterodyne radio receiver offers superb musical reproduction—the result of many recent developments and improvements. Two of the new A. F. Pentode Radiotrons RCA-2A5 are used in the push-pull output stage. Acoustic "tone equalizer" chambers are built into the cabinet, effectually preventing sound distortion resulting from cabinet resonance. A tuning meter, having a translucent illuminated scale, is mounted just above the station selector dial. This meter permits *exact* visual tuning of stations and thus prevents faulty reproduction resulting from inaccurate tuning.

An outstanding feature of this instrument is the use of colored illuminated indicators for all operating controls, showing at a glance just where each control is set. This feature is new, being used for the first time in this series of models. Not only does the harmonious color illumination provide a modern and artistic refinement in appearance, but the indicators will be found of great usefulness in the manipulation of the receiver. Another improvement which has been initiated in this series of instruments is the recessing of the panel for all controls, reducing the extent of knob projection and rendering the controls less conspicuous. A double tone control is provided, also for the first time in this instrument series. Separate tone control knobs permit independent adjustment of the bass and treble response.

The automatic volume control minimizes the effects of "fading." This control also tends to maintain the volume level for which it is set when the dial is shifted from one station to another, thus eliminating "blasting" when passing through the settings of powerful stations.

The silent-tuning control (noise "suppressor" or "silencer") may be set for quiet tuning between station settings, without loss of ability to receive distant stations whose signals are above the background noise level.

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly. Particular attention should be given to the proper connections of the adjacent green and black leads in accordance with the diagram.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible. If the ground connection cannot be made to a cold water pipe, a metal stake driven from 4 to 6 feet into moist earth is recommended. An approved ground clamp should be used to insure a tight and permanent connection.

A terminal board is provided at the rear of the receiver chassis for connecting to the antenna and ground. Connect the antenna lead to the left-hand terminal (marked "ANT") and the ground lead to the right-hand terminal (marked "GND"). Tighten the terminals with a screw driver to insure permanent electrical connections.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label, located on the rear of the receiver.

OPERATION

The operating controls are shown in Figure 1. Proceed as follows:

1. Apply power by turning the Volume Control knob clockwise from the "off" position. Set this control near the middle of its range by observing the illuminated colored indicator associated with the control knob. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

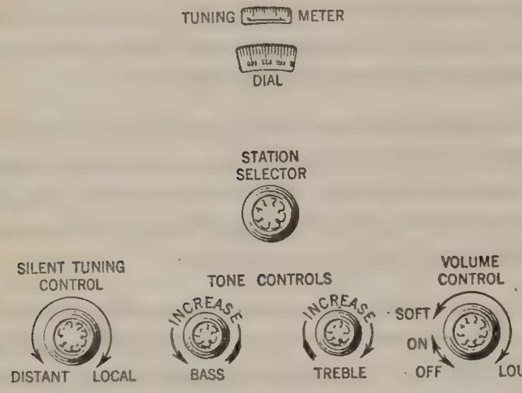

Figure 1

2. With the Silent-Tuning Control set in the extreme counter-clockwise position, turn the Station Selector to a point near the middle range of the dial, at which no station is heard within several scale divisions. Then turn the Silent-Tuning Control clockwise until the background noise (static) just disappears. (The setting of the Silent-Tuning Control is shown by the illuminated colored indicator associated with this control knob.)

NOTE—The adjustment just described provides quiet tuning, that is, *suppression of background noise between station settings*, and permits reception of all stations whose signals are above the existing noise level.

3. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

NOTE—If no stations are received throughout the complete range of the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent-Tuning Control counter-clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

4. When a desirable station signal is heard, accurate tuning *for best reproduction* is accomplished as follows:

(a) Turn the Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position at which the indicator of the tuning meter travels furthest to the right (as designated by the arrow on the meter scale). When receiving a powerful local station, the Station Selector dial should be set at the *center* of the scale *range* for which the meter deflection is maximum (this range may be narrowed somewhat by turning the Silent-Tuning Control clockwise).

(c) Adjust the Volume Control to obtain the desired sound level.

5. Adjust the two Tone Controls to obtain the tone shading preferred. The full range of musical reproduction is obtained with the right-hand knob all the way clockwise and the left-hand knob fully counter-clockwise, and is represented by full illumination of the tone color indicator which extends between the two knobs. Modifications of the tone range may be obtained as follows:

(a) To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise. The extent of high-frequency cut-off thus obtained is indicated by shading of the *yellow* illumination at the right-hand side of the tone color indicator.

(b) To reduce the low-frequency (bass) response, or to decrease low pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise. The extent of low-frequency cut-off thus obtained is indicated by shading of the *blue* illumination at the left-hand side of the tone color indicator.

(c) The *red* illumination at the center of the tone color indicator represents the middle range of musical response. This illumination is not cut off by rotation of either of the tone control knobs as described in the preceding paragraphs (a) and (b).

6. When through operating, interrupt the power by turning the Volume Control to the extreme counter-clockwise (off) position.

Radiotrons—Improved results may sometimes be obtained by interchanging Radiotrons of the same type, either RCA-56 or RCA-58, in their sockets. Spare Radiotrons should be kept on hand.

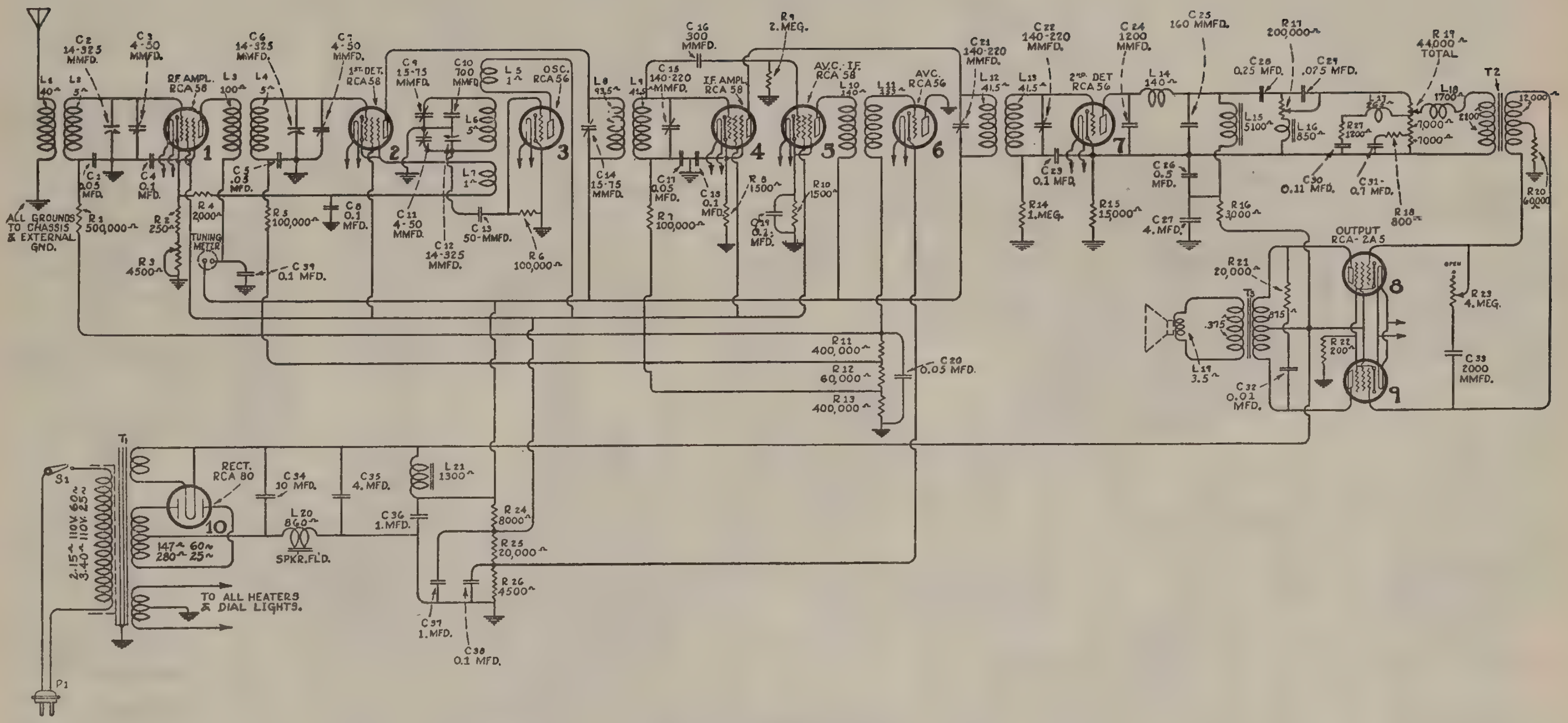

Figure A—Schematic Diagram

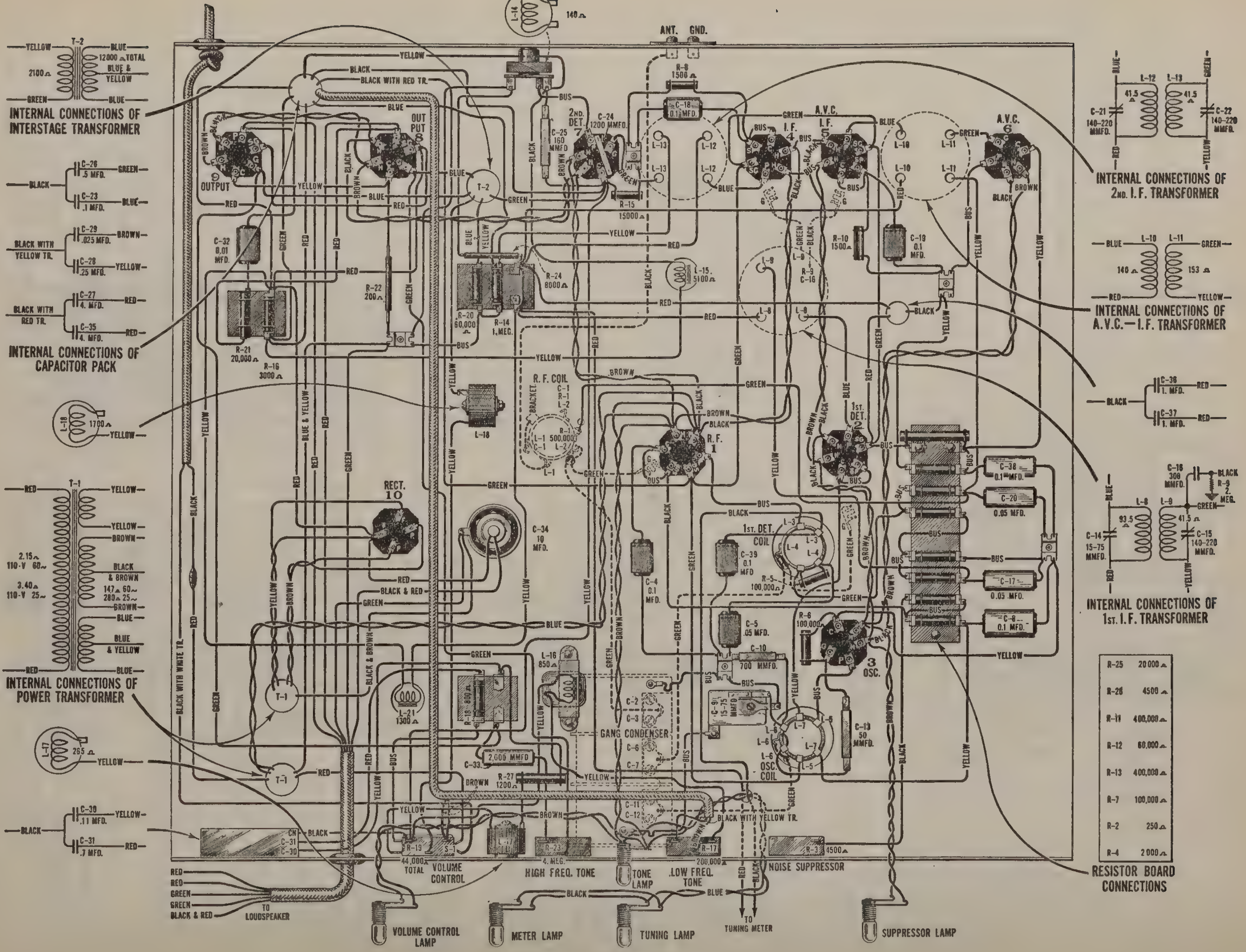

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Power Consumption	120 Watts
Type and Number of Radiotrons	3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range	540 K. C.–1500 K. C.
Undistorted Output	4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated control, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

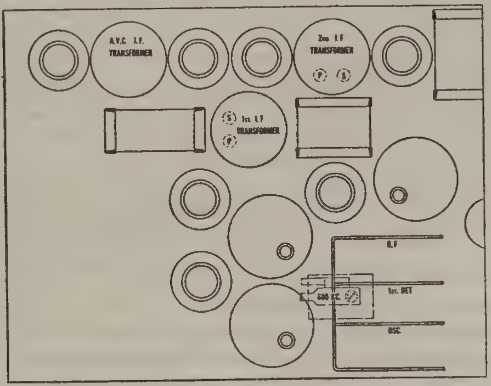

Figure C—Location of Adjustable Capacitors

R. F. and Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C. and 1400 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

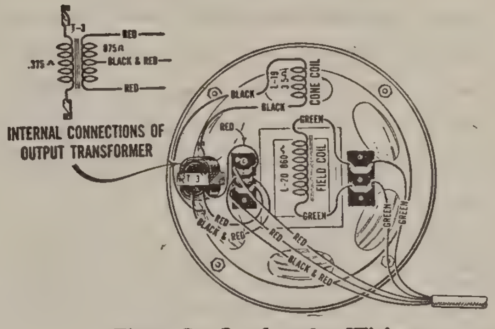

Figure D—Loudspeaker Wiring

(h) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f) and (g).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvonometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C. Line—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	$1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor	.44
3460	Capacitor—1,200 mmfd.	.30
3513	Capacitor—700 mmfd.	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3638	Scale—Tuning meter scale—Package of 5	.60
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6185	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6242	Resistor—2 megohm—Carbon type—½ watt—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	.60
6300	Socket—Four contact Radiotron socket	.35
6314	Capacitor—160 mmfd.—Package of 5	2.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	$0.98
6430	Capacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6433	Coil—Antenna coil assembly	1.80
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6438	Coil—Detector coil	1.44
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd.	1.50
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency escutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6462	Bezel—Tuning meter bezel	.45
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	1.10
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7484	Socket—Five contact Radiotron socket	.35
7485	Socket—Six contact Radiotron socket	.40
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
7580	Scale—Dial and dial scale	.75
7581	Condenser—Three gang variable tuning condenser assembly	5.00
8978	Transformer—Power transformer—105–120 volts—50–60 cycles	8.50
8979	Transformer—Power transformer—105–120 volts—25–40 cycles	12.88
8980	Transformer—Power transformer—210–240 volts—50–60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

Instructions for

RCA Victor R-90-P

Double-Range Bi-Acoustic Superheterodyne with Tonalite Control

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INTRODUCTION

This ten-tube superheterodyne radio receiver offers superb musical reproduction—the result of many recent developments and improvements. Two of the new A. F. Pentode Radiotrons RCA-2A5 are used in the push-pull output stage. Acoustic "tone equalizer" chambers are built into the cabinet, effectually preventing sound distortion resulting from cabinet resonance. A tuning meter, having a translucent illuminated scale, is mounted just above the station selector dial. This meter permits *exact* visual tuning of stations and thus prevents faulty reproduction resulting from inaccurate tuning.

In addition to providing the usual broadcast entertainment from stations in the 540–1500 kilocycle band, this receiver can be tuned to receive stations transmitting in the range from 1500 to 2800 kilocycles. The latter range permits "listening in" to police calls, amateur radio "phone" communication, etc.—a fascinating diversion.

An outstanding feature of this instrument is the use of colored illuminated indicators for the operating controls, showing at a glance just where each control is set. This feature is new, being used for the first time in this series of models. Not only does the harmonious color illumination provide a modern and artistic refinement in appearance, but the indicators will be found of great usefulness in the manipulation of the receiver. Another improvement which has been initiated in this series of instruments is the recessing of the panel for the controls, reducing the extent of knob projection and rendering the controls less conspicuous. A double tone control is provided, also for the first time in this instrument series. Separate tone control knobs permit independent adjustment of the bass and treble response.

The automatic volume control minimizes the effects of "fading." This control also tends to maintain the volume level for which it is set when the dial is shifted from one station to another, thus eliminating "blasting" when passing through the settings of powerful stations.

The silent-tuning control (noise "suppressor" or "silencer") may be set for quiet tuning between station settings, without loss of ability to receive distant stations whose signals are above the background noise level.

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly. Particular attention should be given to the proper connections of the adjacent green and black leads in accordance with the diagram.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

A terminal board is provided at the rear of the receiver chassis for connecting to the antenna and ground. Connect the antenna lead to the left-hand terminal (marked "ANT") and the ground lead to the right-hand terminal (marked "GND"). Tighten the terminals with a screw driver to insure permanent electrical connections.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label, located on the rear of the receiver.

OPERATION

The operating controls are shown in Figure 1. Proceed as follows:

1. Set the Frequency Range Switch for the band desired, as follows:

(a) *Counter-clockwise*—540–1500 kilocycle broadcast band. The dial scale reads directly in kilocycles for this band, using the large numerals.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the bottom of the dial (add two ciphers to obtain kilocycles). The following services are included in this band:

(1) **Police Calls**—Stations operating at 1712 kilocycles, and between 2400 and 2500 kilocycles.

(2) **Amateur Radio "Phone"**—Assigned band 1900—2000 kilocycles.

(3) **Aviation Reports, Airport Beacons, Etc.**—Assigned band 2000—2400 kilocycles.

(4) **Amateur Radio "CW" (Code)**—Assigned band 1715—1900 kilocycles. Signals of this class normally are unintelligible or inaudible with this type of receiver.

> NOTE—The majority of stations in the 1400—2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540—1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400—2800 kilocycles.

2. Apply power by turning the Volume Control knob clockwise from the "off" position. Set this control near the middle of its range by observing the illuminated colored indicator associated with the control knob. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

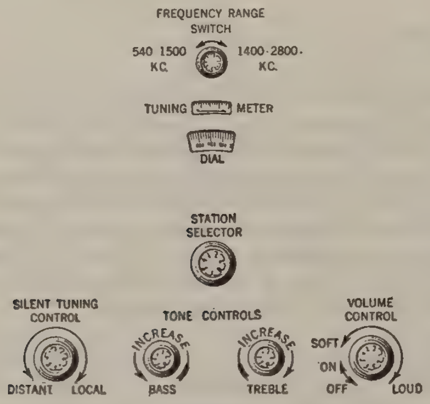


Figure 1

3. With the Silent-Tuning Control set in the extreme counter-clockwise position, turn the Station Selector to a point near the middle range of the dial, at which no station is heard within several scale divisions. Then turn the Silent-Tuning Control clockwise until the background noise (static) just disappears. (The setting of the Silent-Tuning Control is shown by the illuminated colored indicator associated with this control knob.)

> NOTE—The adjustment just described provides quiet tuning, that is, *suppression of background noise between station settings*, and permits reception of all stations whose signals are above the existing noise level.

4. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

> NOTE—If no stations are received throughout the complete range of the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent-Tuning Control counter-clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

5. When a desirable station signal is heard, accurate tuning *for best reproduction* is accomplished as follows:

(a) Turn the Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position at which the indicator of the tuning meter travels farthest to the right (as designated by the arrow on the meter scale). When receiving a powerful local station, the Station Selector dial should be set at the *center* of the scale *range* for which the meter deflection is maximum (this range may be narrowed somewhat by turning the Silent-Tuning Control clockwise).

(c) Adjust the Volume Control to obtain the desired sound level.

6. Adjust the two Tone Controls to obtain the tone shading preferred. The full range of musical reproduction is obtained with the right-hand knob all the way clockwise and the left-hand knob fully counter-clockwise, and is represented by full illumination of the tone color indicator which extends between the two knobs. Modifications of the tone range may be obtained as follows:

(a) To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise. The extent of high-frequency cut-off thus obtained is indicated by shading of the *yellow* illumination at the right-hand side of the tone color indicator.

(b) To reduce the low-frequency (bass) response, or to decrease low pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise. The extent of low-frequency cut-off thus obtained is indicated by shading of the *blue* illumination at the left-hand side of the tone color indicator.

(c) The *red* illumination at the center of the tone color indicator represents the middle range of musical response. This illumination is not cut off by rotation of either of the tone control knobs as described in the preceding paragraphs (a) and (b).

7. When through operating, interrupt the power by turning the Volume Control to the extreme counter-clockwise (off) position.

Radiotrons—Improved results may sometimes be obtained by interchanging Radiotrons of the same type, either RCA-56 or RCA-58, in their sockets. Spare Radiotrons should be kept on hand.

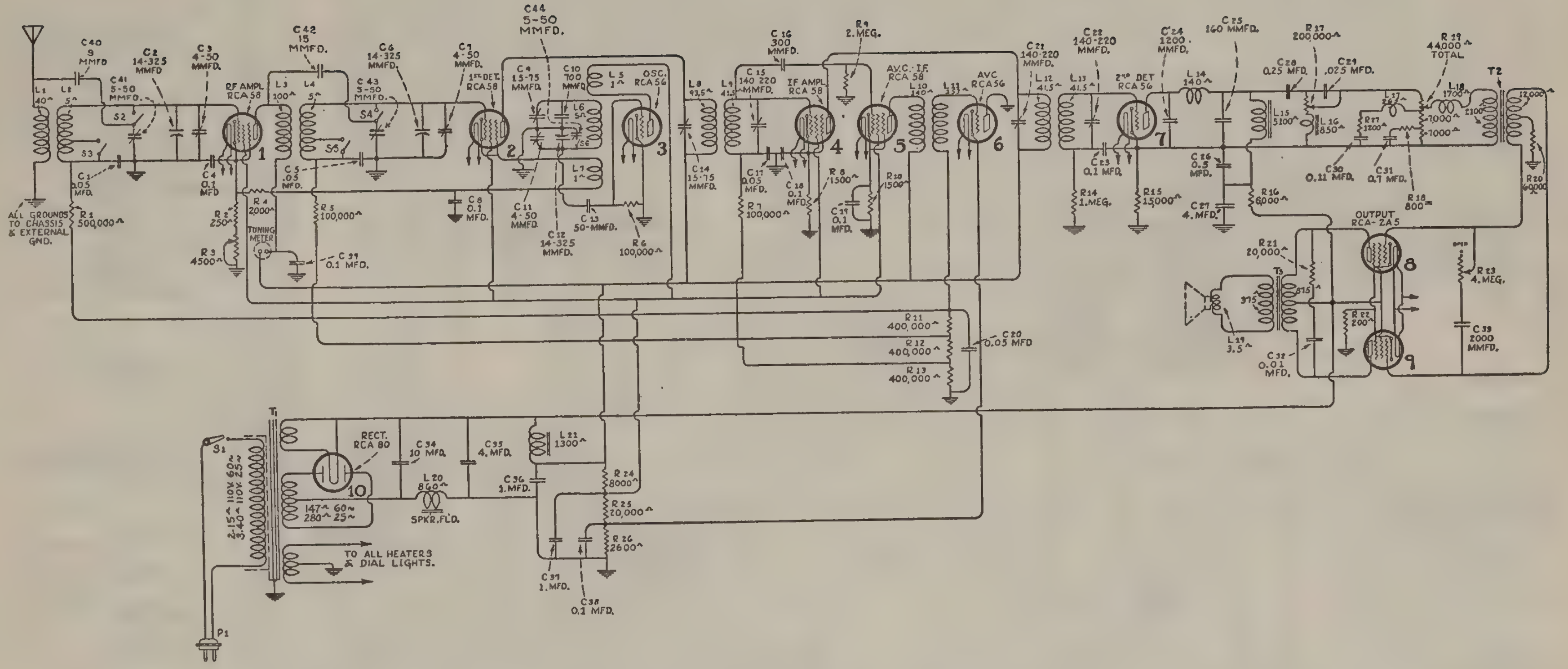


Figure A—Schematic Circuit Diagram

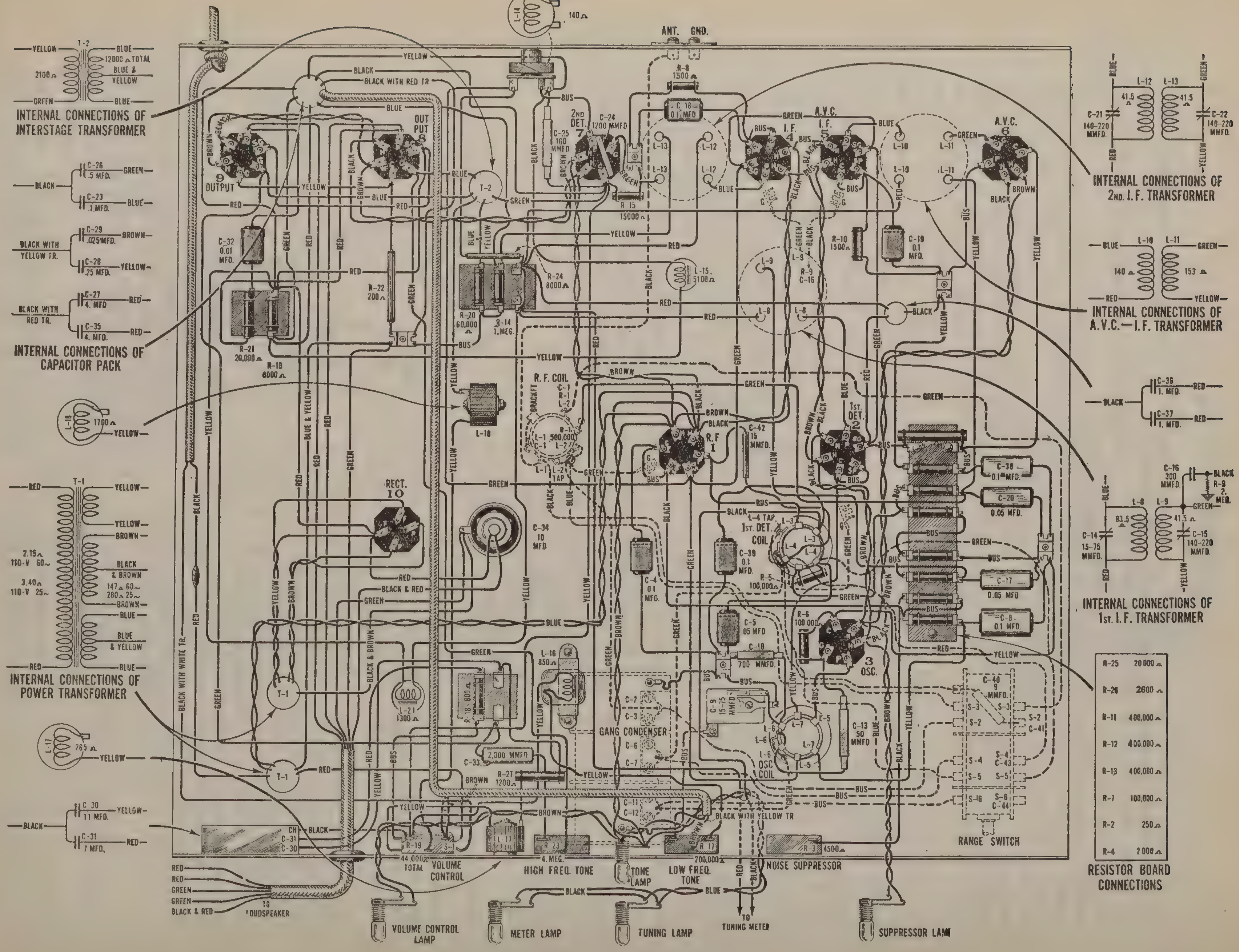


Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Power Consumption	120 Watts
Type and Number of Radiotrons	3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range	540 K. C.—1500 K. C. 1400 K. C.—2800 K. C.
Undistorted Output	4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

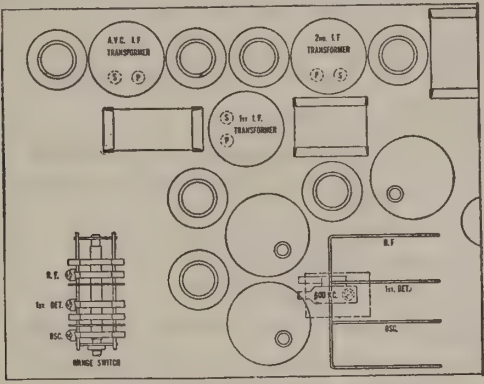


Figure C—Location of Adjustable Capacitors

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

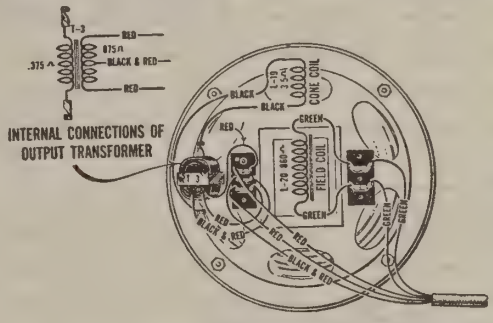


Figure D—Loudspeaker Wiring

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd—Package of 2	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor	.44
3460	Capacitor—1,200 mmfd	.30
3513	Capacitor—700 mmfd	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3546	Capacitor—150 mmfd	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor—Tuning meter	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3598	Capacitor—0.1 mfd	.36
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning Meter scale—Package of 5	.60
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft bushing and nut	.30
3747	Capacitor—15 mmfd	.36
3900	Resistor—2,600 ohms—Carbon type—½ watt—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	$0.60
6314	Capacitor—160 mmfd. —Package of 5	2.00
6316	Resistor—2.500 ohms—Carbon type—½ watt—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	.98
6430	Capacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors in metal container	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd.	1.50
6444	Socket—Five contact Radiotron socket	.36
6445	Socket—Six contact Radiotron socket	.38
6446	Socket—Four contact Radiotron socket	.32
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency excutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6537	Switch—Range switch	1.30
6538	Coil—Antenna coil assembly	1.80
6539	Coil—Detector Coil	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning Meter bezel	.45
6786	Condenser—3 gang variable tuning condenser assembly	7.12
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105-120 volts—50-60 cycles	8.50
8979	Transformer—Power transformer—105-120 volts—25-40 cycles	12.88
8980	Transformer—Power transformer—210-240 volts—50-60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23526

Printed in U. S. A

RCA Victor

Test Oscillator

Type TMV-97-A

INSTRUCTIONS

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

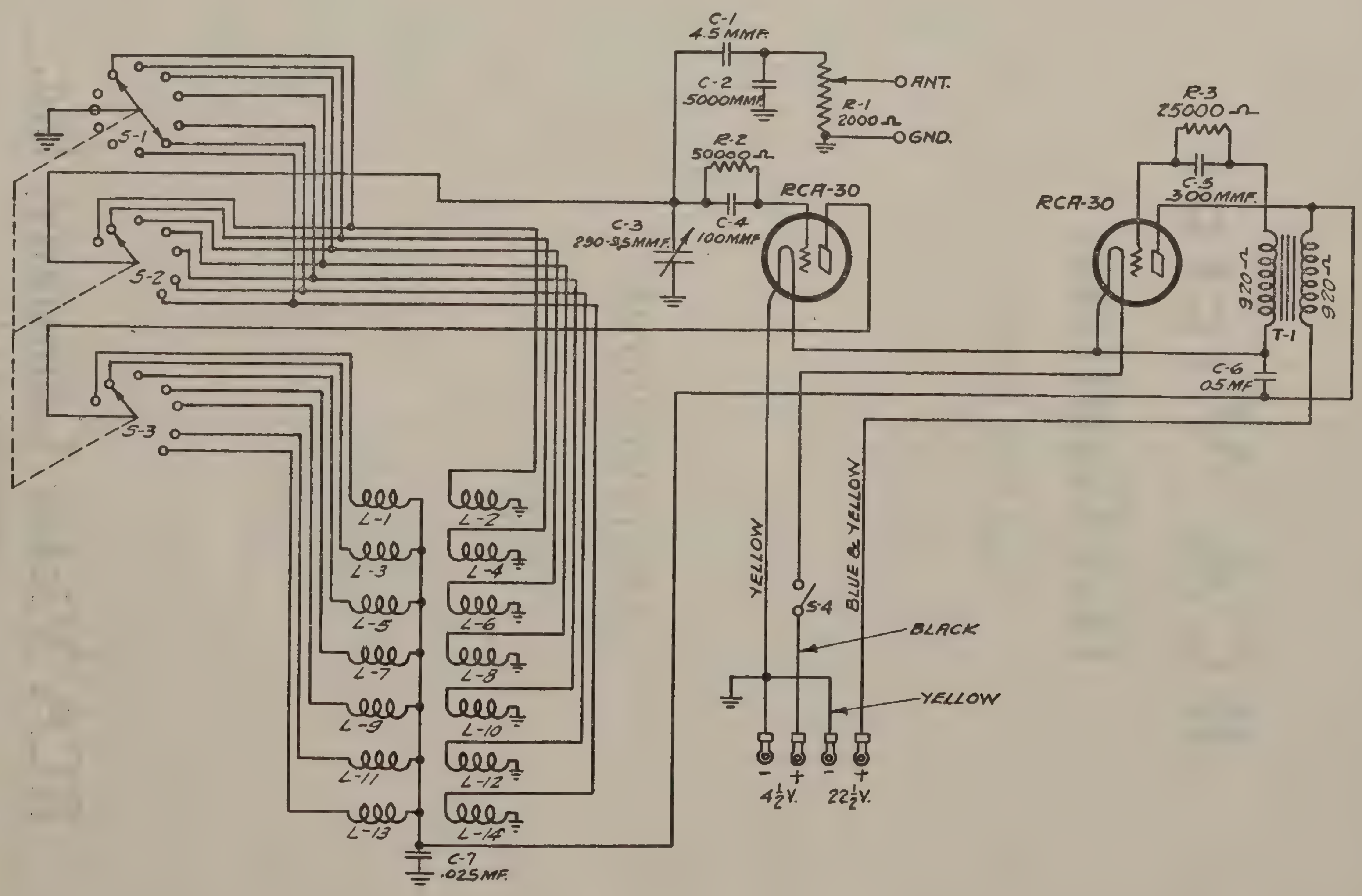


Figure 1—Schematic Circuit

Instructions for

Test Oscillator

Type TMV-97-A

Introduction

The Type TMV-97-A Test Oscillator is a compact, self-contained portable oscillator designed especially for servicing and test purposes. It is an R. F. oscillator, modulated at 400 cycles and covers the frequency range from 150 K. C. to 25,000 K. C. in seven steps. Power for its two Radiotrons, RCA-30, is obtained from two self-contained batteries. The instrument is entirely shielded in an aluminum case.

Controls on the front panel are the "On-Off" switch, vernier tuning dial, range switch and output control. Two binding posts are also provided for conveniently connecting its output to the circuit being tested.

The over-all dimensions of the instrument are approximately 9¾″ wide, 4½″ deep and 8½″ high (including handle). Its weight is 3½ lbs. including batteries.

The following frequency ranges are covered by the seven position Range Switch.

Position	*Frequency Range* (*K. C.*)
1	150–330
2	330–720
3	720–1460
4	1460–3050
5	3050–7400
6	7400–14300
7	14300–25000

The oscillator is shipped complete with Radiotrons, but less batteries. Figure 1 shows the schematic diagram and Figure 2 the wiring diagram.

Installation of Batteries

Two batteries are required, one 4½ volt filament battery (Burgess No. 2370, Eveready No. 771 or equivalent) and one 22½ volt "B" battery (Burgess No. 4156 or equivalent).

Remove the four screws at the top and side edges of the front panel and withdraw the chassis from the cabinet. Make certain that the Radiotrons are firmly in their sockets and the "On-Off" switch is off. Then turn the chassis upside down. Sufficient space is allowed beneath the chassis for insertion of the batteries, which should be located and connected as shown in Figure 3. Turn the case over on its top and replace the chassis while both chassis and cabinet have their bottom uppermost. This assures proper location of the chassis and batteries within the case. Then turn the oscillator over and replace its front panel mounting screws. The unit is then ready for operation.

Operation

1. The output of the oscillator is connected to the receiver under test by means of the two binding posts located on its front panel. A reference to the service instructions for the receiver under test will disclose the proper place for making such connections to the receiver.

2. Turn the oscillator "on" and adjust the tuning dial and range switch to obtain the desired frequency signal. A reference to the calibration charts on pages 6 to 9 inclusive, gives the proper dial setting for the various frequencies. Also see notes under "Calibration."

> NOTE—The vernier tuning ratio may be varied from 6:1 to 20:1 by adjustment of the position of the small arm above the tuning knob. The extreme clockwise position of the arm gives a 20:1 ratio which is very useful for critical tuning.

3. The output of the oscillator is varied by means of the small knob located on the right side of the panel. For comparing sensitivity, it may be necessary to further decrease the output from that obtained at the minimum position of the output control. This may be done by using two carbon resistors, one of 100 ohms and the other of 100,000 ohms resistance, connected in series and placed across the antenna and ground binding posts of the oscillator. (The 100 ohm resistor must be connected to the ground binding post.) Connect the receiver antenna lead to the junction of the two resistors and the ground lead to the ground terminal. Then by recording the position of the output dial setting throughout the receiver range (for same signal output) a good indication of the relative receiver sensitivity may be obtained.

> NOTE—At the higher frequencies it may be necessary to move the oscillator a short distance from the receiver to avoid stray pickup.

Calibration

Figures 4, 5, 6, and 7 show typical calibration curves for the TMV-97-A oscillator. The individual oscillators will be found to be within plus or minus 3% of these calibration curves. However, as it is usually desirable to have a more accurate calibration than these curves, blank graph sheets are given in Figures 8, 9, 10 and 11 for each owner to calibrate his own instrument. This is done by tuning in stations in the various ranges on a receiving set and then beating them with the test oscillator for zero beat. The frequency of the test oscillator will then be identical with that of the station. By noting the oscillator dial reading and the station frequency, a very accurate calibration may be plotted on the pages indicated.

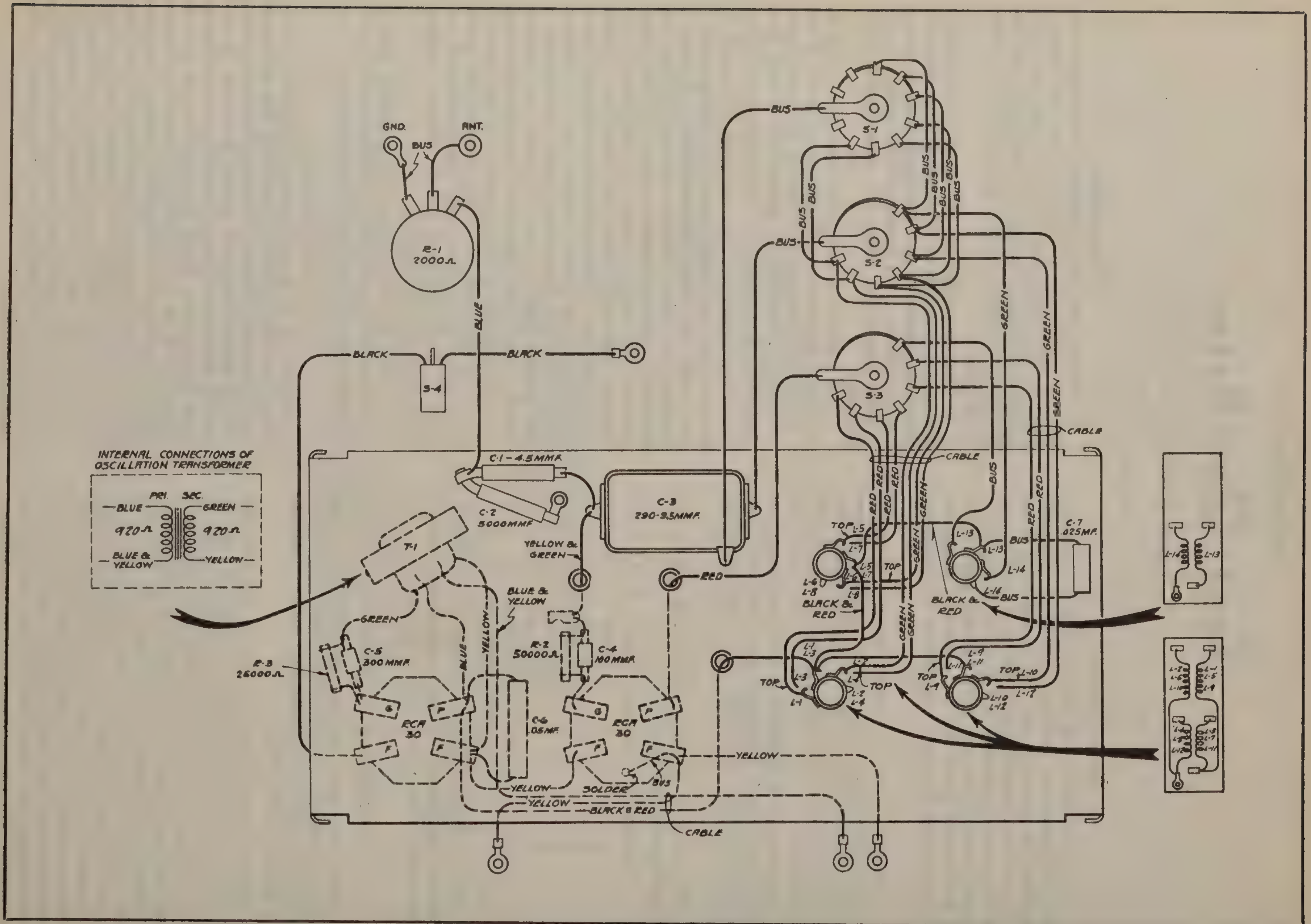


Figure 2—Wiring Diagram

For the lower frequencies, 150 K. C. to 550 K. C., a calibration is readily made by using harmonies of the oscillator for checking against frequencies in the broadcasting band. For example, 175 K. C. can be checked by beating its fourth harmonic with Station WLW, the frequency of which is 700 K. C.

NOTE—For the convenience during calibration, we have listed a number of prominent broadcasting stations opposite their frequency on pages 14, 15 and 16.

Maintenance

The battery voltages should be checked if at any time the output of the oscillator becomes weak. The drain on the batteries is small, so that their expected life is approximately 15 hours' operation. However, the batteries should be replaced when the filament battery voltage is less than 3 volts and the "B" battery voltage is less than 17 volts. Always replace the batteries by withdrawing the entire unit from the front of the cabinet. Never remove the back panel.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
2039	Switch—Single pole, single throw toggle switch	$0.72
2744	Capacitor—4.5 mmfd. capacitor (C1)—Package of 5	1.60
2932	Capacitor—5,000 mmfd. capacitor (C2)	.50
3110	Resistor—25,000 ohm—¼ watt carbon resistor (R3)—Package of 5	1.00
3114	Resistor—50,000 ohm—¼ watt carbon resistor (R2)—Package of 5	1.00
3640	Capacitor—.05 mfd. capacitor (C6)	.25
3765	Capacitor—.025 mfd. capacitor (C7)	.34
3794	Capacitor—100 mmfd. capacitor (C4)	.30
3975	Coil—R. F. oscillation coil (L1, L2, L3, L4)	1.38
3976	Coil—R. F. oscillation coil (L5, L6, L7, L8)	1.38
3977	Coil—R. F. oscillation coil (L9, L10, L11, L12)	1.28
3978	Coil—R. F. oscillation coil (L13, L14)	1.28
3979	Transformer—A. F. oscillation transformer (T1)	$1.94
3980	Condenser—Tuning condenser (C3)	1.40
3981	Capacitor—300 mmfd. capacitor (C5)	.30
3982	Handle—Carrying handle	.60
3983	Switch—Range switch (S1, S2, S3)	3.94
3984	Knob—Moulded knob	.30
3985	Scale—Range switch dial scale	.66
3986	Scale—Attenuator potentiometer dial scale	.66
3987	Potentiometer — Attenuator potentiometer (R1)	1.70
3988	Post—"Antenna-Ground" binding post	.32
3989	Dial—Tuning condenser vernier dial	4.15
3990	Clip—Spring steel clip	.25
6300	Socket—Radiotron socket	.35

PL 91

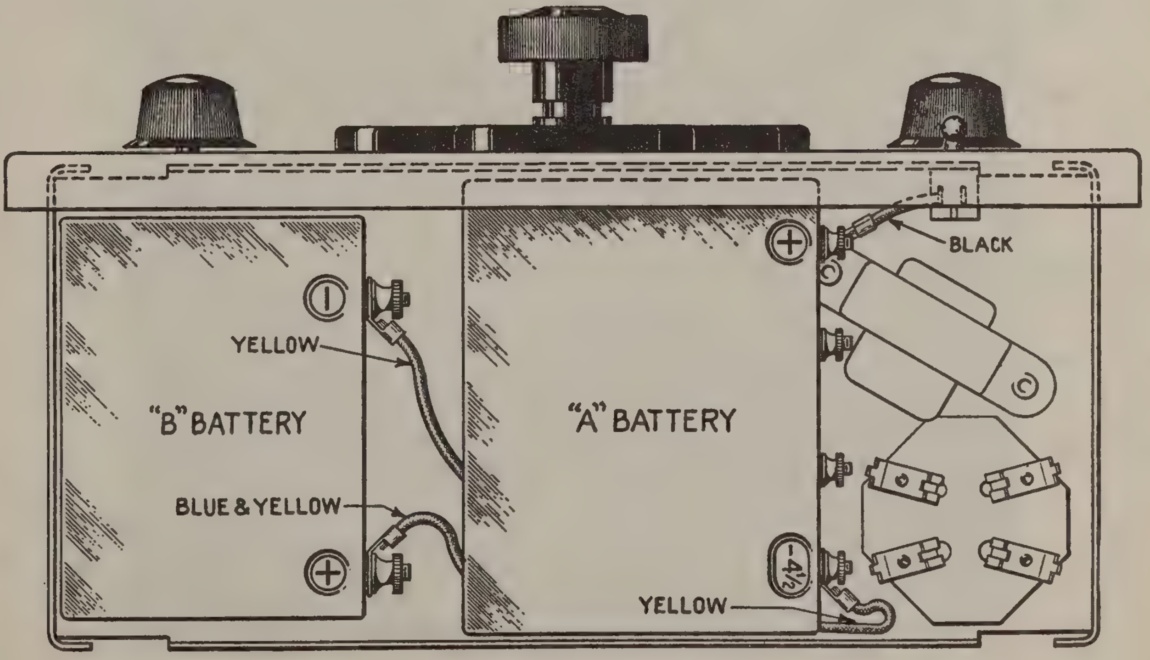


Figure 3—Location of Batteries

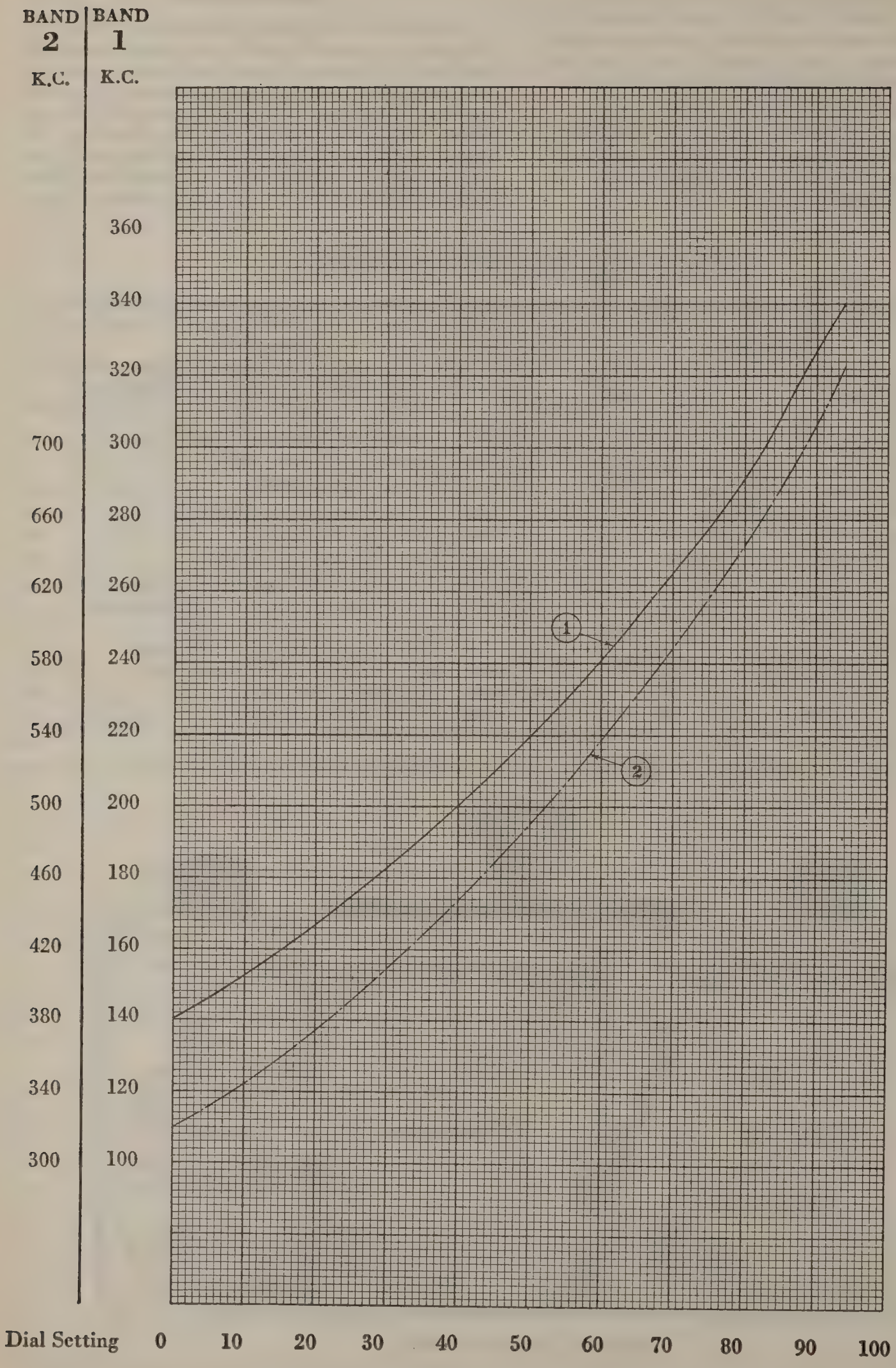


Figure 4—Typical Calibration Curves of Bands 1 and 2

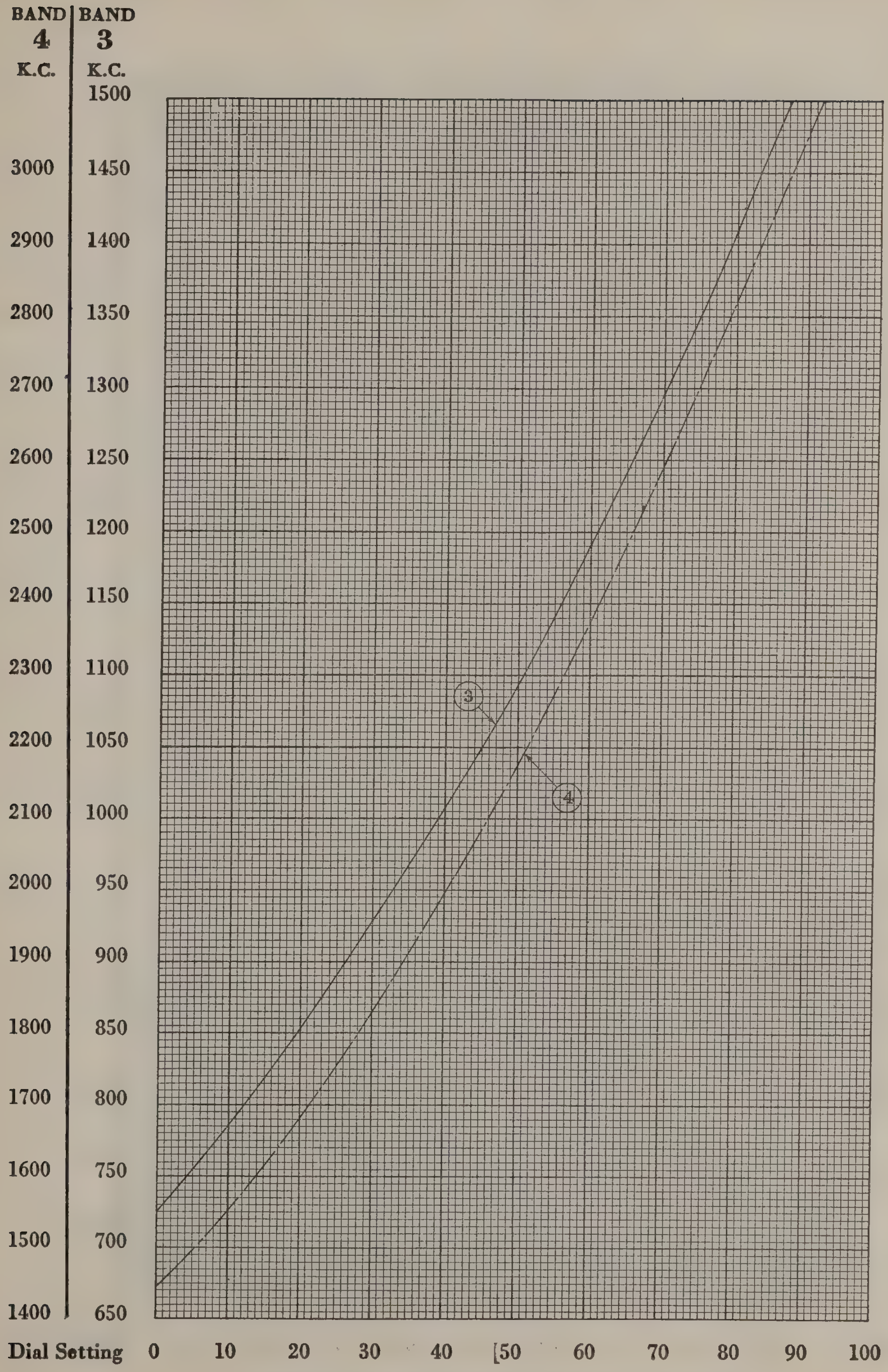


Figure 5—Typical Calibration Curves of Bands 3 and 4

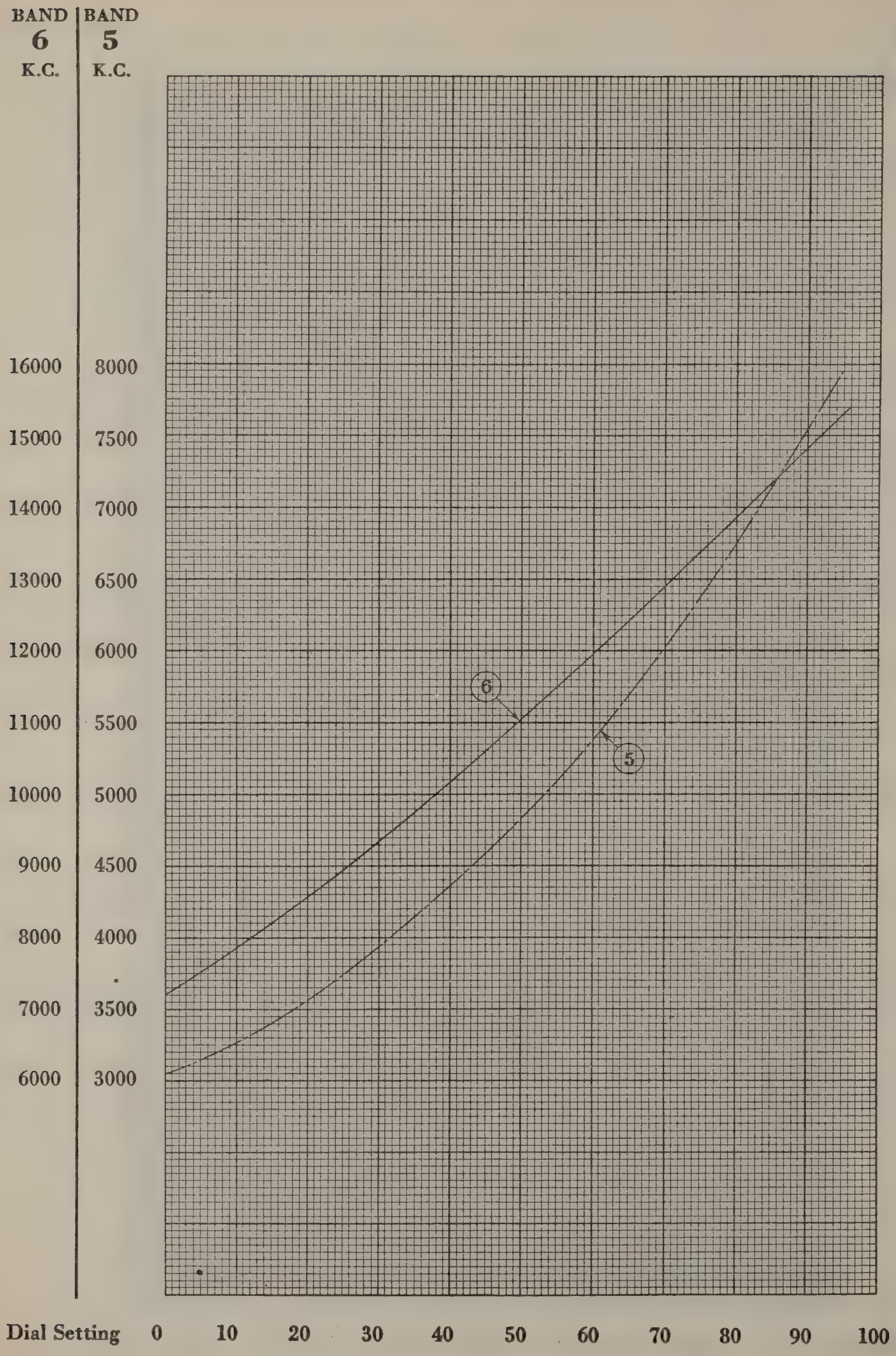


Figure 6—Typical Calibration Curves of Bands 5 and 6

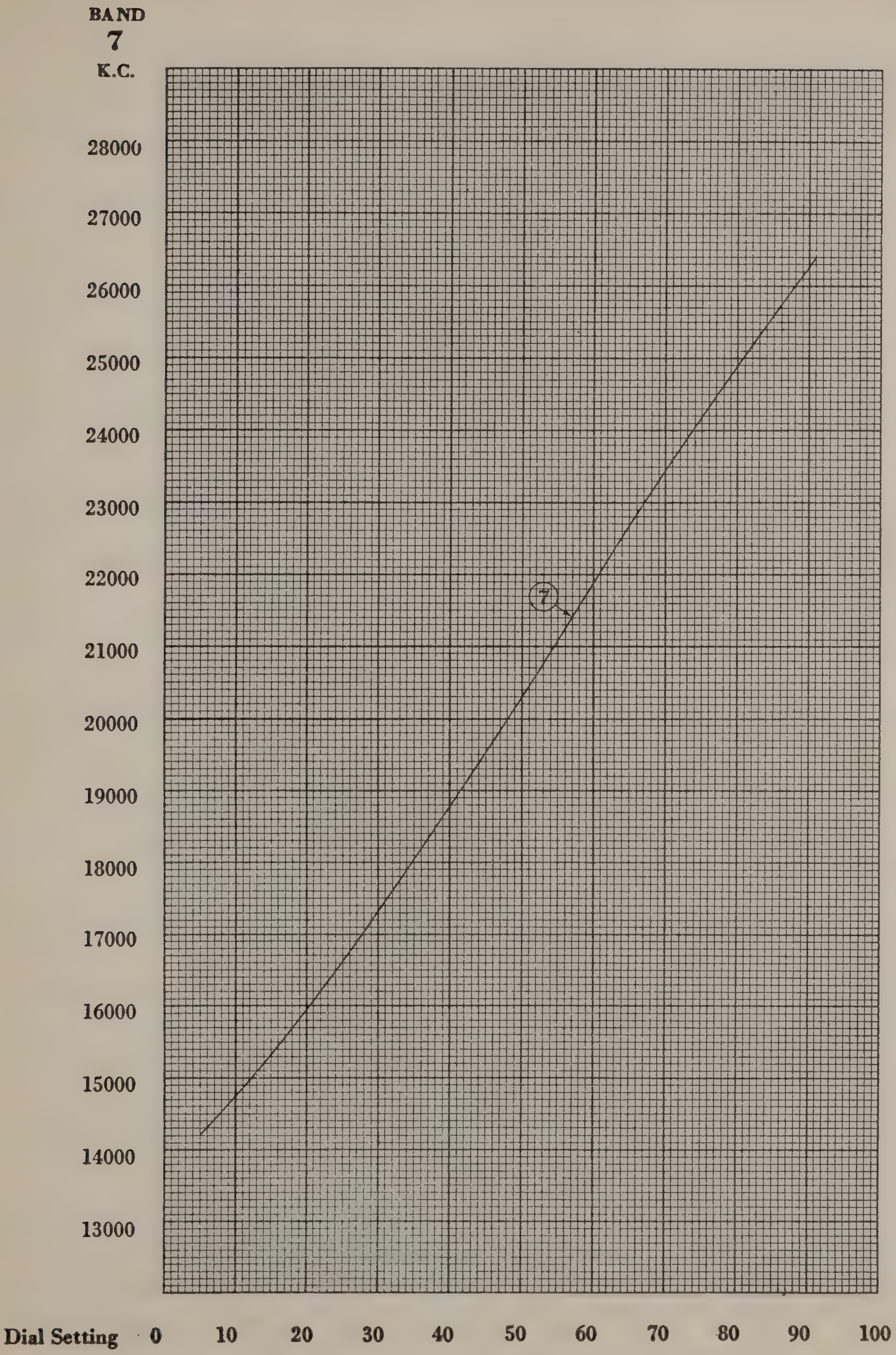


Figure 7—Typical Calibration Curve of Band 7

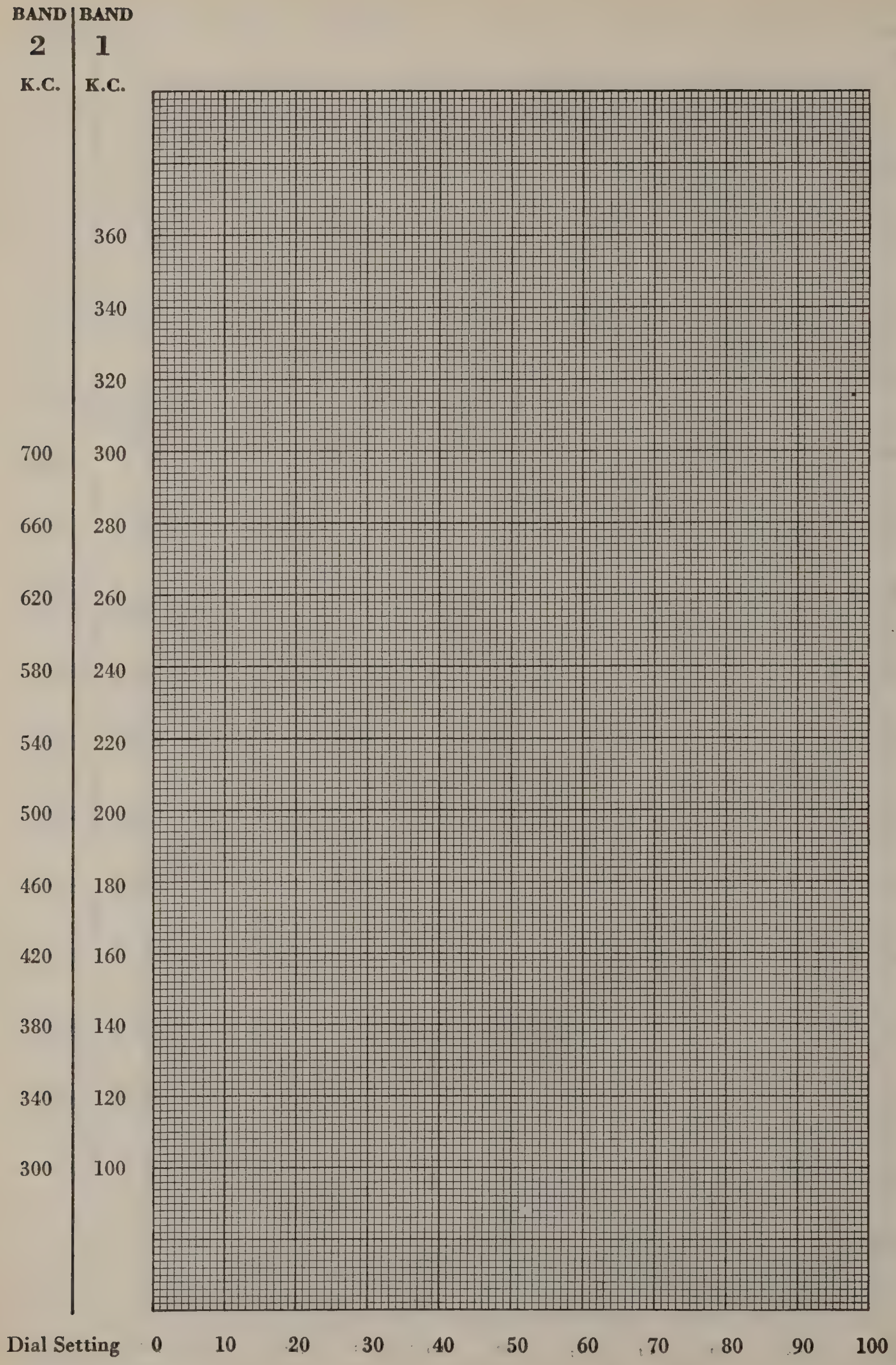


Figure 8—Graph Sheet for Plotting Curves of Bands 1 and 2

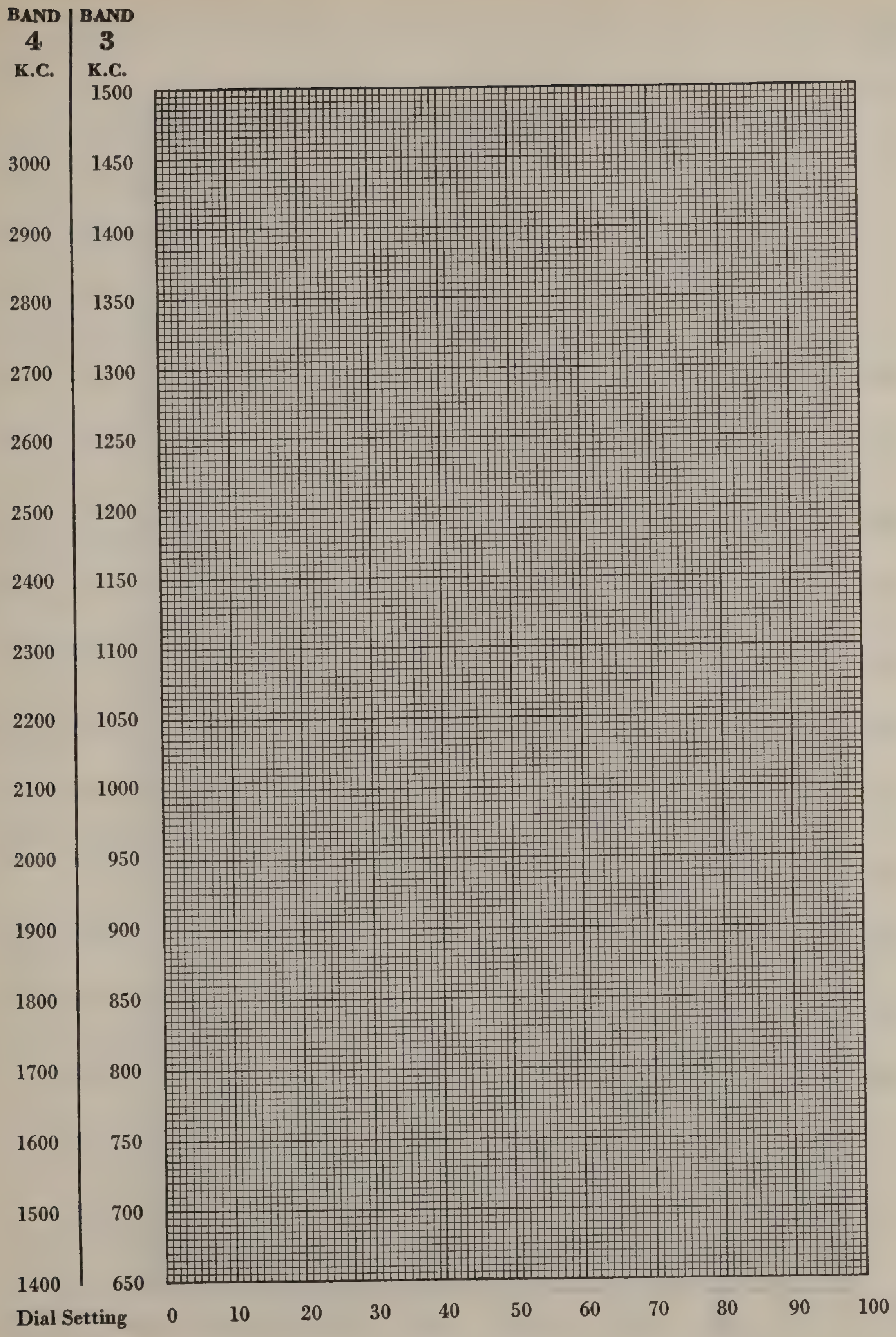


Figure 9—Graph Sheet for Plotting Curves of Bands 3 and 4

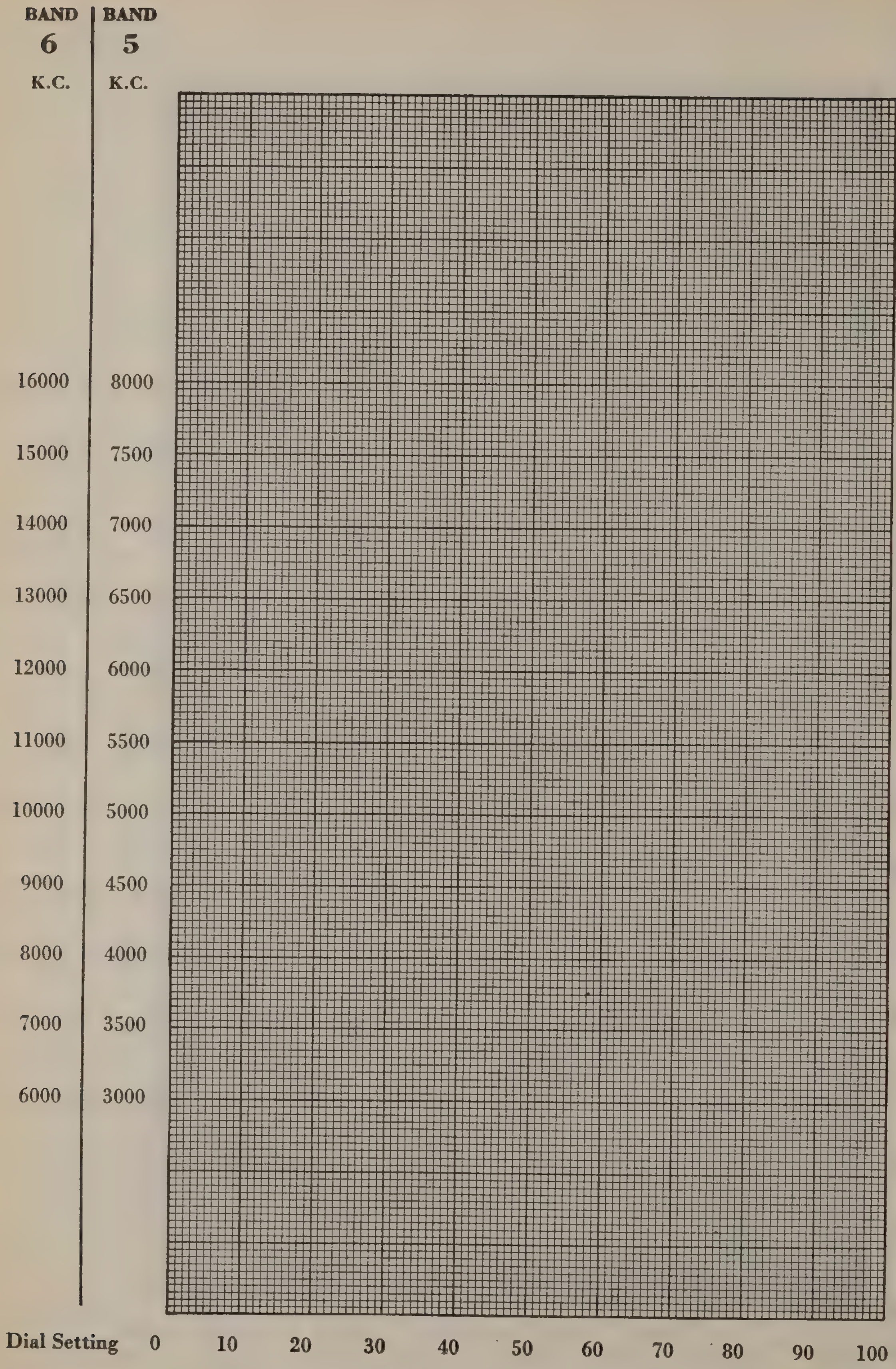


Figure 10—Graph Sheet for Plotting Curves of Bands 5 and 6

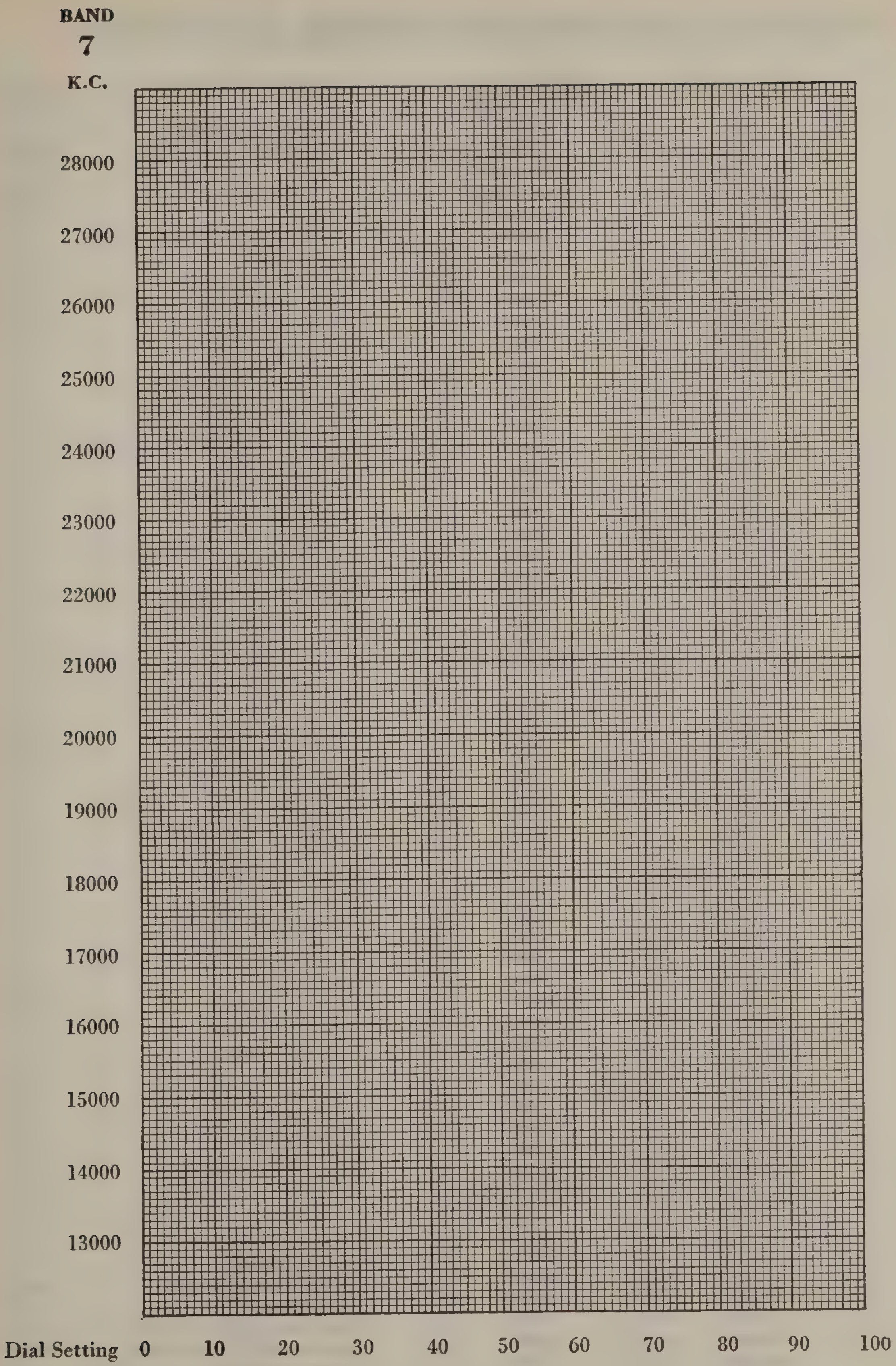


Figure 11—Graph Sheet for Plotting Curves of Band 7

SHORT WAVE BROADCASTING STATIONS

STATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	STATION LOCATION	POWER (Kilowatts)
POLICE	190	1574	United States (State)	½ (max.)
POLICE	175	1712	United States	½ (max.)
AMATEUR	167–150	1800–2000	Phone	1 (max.)
POLICE	124–120	2412–2506	United States	½ (max.)
AMATEUR	77–75	3900–4000	Phone	1 (max.)
RW15	70.2	4273	Khabarovsk, U. S. S. R.	20
HVJ	50.21	5968	Vatican City	10
RV49	50.0	6000	Moscow, U. S. S. R.	20
VE9DR	49.95	6005	Montreal, Canada	4
DJC	49.83	6020	Berlin, Germany	5
W4XB	49.67	6040	Miami, Fla., U. S. A.	2
GSA	49.59	6050	London, England	20
W3XAU	49.5	6060	Philadelphia, Pa., U. S. A.	1
W8XAL	49.5	6060	Cincinnati, Ohio, U. S. A.	10
VQ7LO	49.5	6060	Nairobi, Kenya, Africa	1
W9XAA	49.34	6080	Chicago, Ill., U. S. A.	½
CP5	49.26	6090	La Paz, Bolivia	1
OXY	49.26	6090	Copenhagen, Denmark	½
VE9GW	49.22	6095	Toronto, Canada	1/8
W9XF	49.18	6100	Chicago, Ill., U. S. A.	5
W3XAL	49.18	6100	New York, N. Y., U. S. A.	35
YV1BC	49.10	6110	Caracas, Venezuela	1/8
ZTJ	49.02	6120	Johannesburg, Africa	5
W2XE	49.02	6120	New York, N. Y., U. S. A.	5
W8XK	48.86	6140	Pittsburgh, Pa., U. S. A.	40
AMATEUR	42.86–41.1	7000–7300	Mostly Code	1 (max.)
HBP	38.48	7797	Geneva, Switzerland	20
CNR	32.26	9300	Rabat, Morocco, Africa	12
GSB	31.55	9510	London, England	20
VK3ME	31.55	9510	Melbourne, Australia	25
OXY	31.51	9520	Copenhagen, Denmark	½
W2XAF	31.48	9530	Schenectady, N. Y., U. S. A.	40
DJA	31.38	9560	Berlin, Germany	5
W1XAZ	31.36	9570	Springfield, Mass., U. S. A.	10
GSC	31.30	9585	London, England	20
VK2ME	31.28	9590	Sydney, Australia	12
W3XAU	31.28	9590	Philadelphia, Pa., U. S. A.	1
HBL	31.26	9595	Geneva, Switzerland	20
XETE	31.25	9600	Mexico City, Mexico	1
EAQ	30.43	9855	Madrid, Spain	20
FYA	25.64	11700	Paris, France	12
VE9JR	25.62	11710	Winnipeg, Canada	2
GSD	25.53	11750	London, England	20
DJD	25.51	11760	Berlin, Germany	5
12RO	25.4	11810	Rome, Italy	9
W2XE	25.36	11830	New York, N. Y., U. S. A.	5
GSE	25.29	11865	London, England	20
W8XK	25.27	11870	Pittsburgh, Pa., U. S. A.	40
FYA	25.21	11900	Paris, France	12
CNR	23.38	12830	Rabat, Morocco, Africa	12
AMATEUR	21.2–21.1	14150–14250	Phone	1 (max.)
HVJ	19.84	15120	Vatican City	10
GSF	19.82	15140	London, England	15
DJB	19.74	15200	Berlin, Germany	5
W8XK	19.72	15210	Pittsburgh, Pa., U. S. A.	40
FYA	19.68	15240	Paris, France	12
W2XE	19.64	15270	New York, N. Y., U. S. A.	5
W2XAD	19.57	15330	Schenectady, N. Y., U. S. A.	25
GSG	16.88	17770	London, England	15
PHI	16.88	17775	Huizen, Holland	20
W3XAL	16.87	17780	New York, N. Y., U. S. A.	35

MEDIUM WAVE STATIONS

U. S. A., Canada and Mexico

STATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	STATION LOCATION	POWER (Watts)
CKLW	555.2	540	Windsor, Ont.	5000
WGR	545.1	550	Buffalo, N. Y.	1000
WQAM	535.4	560	Miami, Fla.	1000
WWNC	526.0	570	Asheville, N. C.	1000
XEPN	516.9	580	Piedras Negras, Coah.	75000
CMW	508.2	590	Havana, Cuba	1400
KFSD	499.7	600	San Diego, Cal.	1000
WDAF	491.5	610	Kansas City, Mo.	1000
WTMJ	483.6	620	Milwaukee, Wis.	1000
XFG	475.9	630	Mexico City, D. F.	2000
KFI	468.5	640	Los Angeles, Cal.	50000
WSM	461.3	650	Nashville, Tenn.	50000
WEAF	454.3	660	New York, N. Y.	50000
WMAQ	447.5	670	Chicago, Ill.	5000
KPO	440.9	680	San Francisco, Cal.	50000
CFRB	434.5	690	Toronto, Ont.	10000
WLW	428.3	700	Cincinnati, O.	50000
WOR	422.3	710	Newark, N. J.	5000
WGN	416.4	720	Chicago, Ill.	25000
XER	410.7	730	Villa Acuna, Coah.	150000
WSB	405.2	740	Atlanta, Ga.	50000
WJR	399.8	750	Detroit, Mich.	10000
WJZ	394.5	760	New York, N. Y.	50000
WBBM	389.4	770	Chicago, Ill.	25000
XEYZ	384.4	780	Mexico City, D. F.	10000
WGY	379.5	790	Schenectady, N. Y.	50000
WBAP	374.8	800	Fort Worth, Tex.	50000
WFAA	374.8	800	Dallas, Tex.	50000
WCCO	370.2	810	Minneapolis, Minn.	50000
WHAS	365.6	820	Louisville, Ky.	25000
KOA	361.2	830	Denver, Colo.	12500
CMC	356.9	840	Havana, Cuba	500
WWL	352.7	850	New Orleans, La.	10000
WABC	348.6	860	New York, N. Y.	50000
WENR	344.6	870	Chicago, Ill.	50000
WLS	344.6	870	Chicago, Ill.	50000
KLX	340.7	880	Oakland, Cal.	1000
CMX	336.9	890	Havana, Cuba	1000
WLBL	333.1	900	Stevens Point, Wis.	2500
CKY	329.6	910	Winnipeg, Man.	5000
WWJ	325.9	920	Detroit, Mich.	1000
KMA	322.4	930	Shenandoah, Iowa	500
KOIN	319.0	940	Portland, Ore.	1000
KMBC	315.6	950	Kansas City, Mo.	1000
CRCT	312.3	960	Toronto, Ont.	5000
KJR	309.1	970	Seattle, Wash.	5000
KDKA	303.9	980	Pittsburgh, Pa.	50000
WBZ	302.8	990	Springfield, Mass.	25000
WOC	299.8	1000	Des Moines, Ia.	50000
KQW	296.9	1010	San Jose, Cal.	500
KYW	293.9	1020	Chicago, Ill.	10000
CFCN	291.1	1030	Calgary, Alta.	10000
KTHS	288.3	1040	Hot Springs, Ark.	10000
KNX	285.5	1050	Hollywood, Cal.	25000
WTIC	282.8	1060	Hartford, Conn.	50000
WTAM	280.2	1070	Cleveland, O.	50000
WBT	277.6	1080	Charlotte, N. C.	25000
KMOX	275.1	1090	St. Louis, Mo.	50000
WPG	272.6	1100	Atlantic City, N. J.	5000
WRVA	270.1	1110	Richmond, Va.	5000
KTRH	267.7	1120	Houston, Tex.	1000
KSL	265.3	1130	Salt Lake City, U.	50000
WAPI	263.0	1140	Birmingham, Ala.	5000
WHAM	260.7	1150	Rochester, N. Y.	25000

Medium Wave Stations — U. S. A., Canada and Mexico (Continued)

STATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	STATION LOCATION	POWER (Watts)
WOWO	258.5	1160	Fort Wayne, Ind.	10000
WCAU	256.3	1170	Philadelphia, Pa.	50000
KOB	254.1	1180	Albuquerque, N. M.	10000
WOAI	252.0	1190	San Antonio, Tex.	50000
WIBX	249.9	1200	Utica, N. Y.	100
WBAX	247.8	1210	Wilkes-Barre, Pa.	100
WCAE	245.8	1220	Pittsburgh, Pa.	1000
KYA	243.8	1230	San Francisco, Cal.	1000
WXYZ	241.8	1240	Detroit, Mich.	1000
WAAM	239.9	1250	Newark, N. J.	1000
KUOA	238.0	1260	Fayetteville, Ark.	1000
WFBR	236.1	1270	Baltimore, Md.	500
WCAM	234.2	1280	Camden, N. J.	500
KTSA	232.4	1290	San Antonio, Tex.	1000
WHAZ	230.6	1300	Troy, N. Y.	500
WHAT	228.9	1310	Philadelphia, Pa.	100
WSMB	227.1	1320	New Orleans, La.	500
WDRC	225.4	1330	Hartford, Conn.	1000
WSPD	223.7	1340	Toledo, Ohio	1000
KWK	222.1	1350	St. Louis, Mo.	1000
WFBL	220.4	1360	Syracuse, N. Y.	1000
WDAS	218.8	1370	Philadelphia, Pa.	100
WSMK	217.3	1380	Dayton, O.	200
KOY	215.7	1390	Phoenix, Arizona	500
WLTH	214.2	1400	Brooklyn, N. Y.	500
WSFA	212.6	1410	Montgomery, Ala.	500
WMAS	211.1	1420	Springfield, Mass.	100
WHP	209.7	1430	Harrisburg, Pa.	500
KXYZ	208.2	1440	Houston, Tex.	250
WHOM	206.8	1450	Jersey City, N. J.	250
KSTP	205.4	1460	St. Paul, Minn.	25000
KGA	204.0	1470	Spokane, Wash.	5000
KOMA	202.6	1480	Oklahoma City, Okla.	5000
WCKY	201.2	1490	Covington, Ky.	5000
WWRL	199.9	1500	Woodside, N. Y.	100

MEDIUM AND LONG WAVE STATIONS

Europe

STATION LOCATION	WAVE LENGTH (Meters)	FREQUENCY (Kilocycles)	POWER (Watts)
Huizen, Holland	1875	160	8500
Radio, Paris	1725	174	75000
Berlin, Germany	1635	183.5	60000
Daventry National	1554.4	193	30000
Warsaw I, Poland	1412	212.5	120000
Luxembourg	1190	252	200000
Oslo, Norway	1083	277	60000
Budapest No. 1, Lakihegy (Hungary)	550	545	18500
Florence, iFI, Italy	500.8	599	20000
Prague (Czechoslovakia)	488.6	614	120000
North Regional (Manchester) England	480	625	50000
Langenberg, (Germany)	472.4	635	60000
Beromunster (Schweizerischer Landessender) (Switzerland)	459.4	653	60000
Rome, IRO	441.2	680	50000
Moscow, Russia	424.3	707	100000
Katowitz (Poland)	408.7	734	16000
Toulouse (Radiophonie di Midi) (France)	385.1	779	8000
London Regional (Brookmans Park)	355.9	843	50000
Poste Parisien (France)	328.2	914	60000
Hilversum (Holland)	296.1	1013	20000
Heilsberg (Germany)	276.5	1085	60000
London National and West National	261.5	1147	50000
Toulouse, PTT (France)	255.1	1176	700
Nurnberg (Germany)	238.9	1256	2000

Printed in U. S. A.

Instructions for

RCA Victor 100

Four-Tube Double-Range Superheterodyne

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. Before making the necessary external connections, remove the cardboard covers used to protect the two unshielded tubes at the rear of the receiver, then refer to the chassis diagram printed on the license label attached to the cabinet and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the tubes shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the dome terminals of the proper tubes as indicated, and that the spring contact clips are pressed down firmly.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects and run neither close nor parallel to electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length will be found satisfactory. An outdoor antenna of greater length, however, should improve reception and is recommended for use in localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. The ground lead should be as short as possible and attached preferably to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Power Cord—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the license label.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

(1) **Power Switch and Volume Control** (Left-hand Knob)—In the extreme counter-clockwise position, the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) **Tone Range Switch** (Lower Middle Knob)—This switch has two positions. The clockwise position provides full-range reproduction. When the knob is turned counter-clockwise, treble response and static interference (when latter is present) will be reduced.

(3) **Station Selector** (Upper Middle Knob)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) **Frequency Range Switch** (Right-hand Knob)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1600–3500 kilocycle range will be received (frequencies in this range are indicated approximately by the small outer numerals), as follows:

   (a) *Police Calls*—At dial settings near "170" for stations transmitting at 1712 kilocycles and between "240" and "260" for stations operating in the 2450 kilocycle band.

   (b) *Amateur Radio "Phone"*—At dial settings between "180" and "200" (assigned band 1800–2000 kilocycles).

   (c) *Aviation Communications "Phone"*—At dial settings above "240" (2500–3500 kilocycles).

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).

2. Apply power by turning the Volume Control knob slightly clockwise from the "off" position until the "on" click of the power switch is heard and the dial is illuminated. Several seconds will be required for the tubes to heat before reproduction is possible. Set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.

3. Rotate the Station Selector slowly over the range of the dial until a desirable station program is heard.

> NOTE—The majority of stations in the 1600–3500 kilocycle band do not offer continuous programs. Police calls are usually intermittent at regular or irregular intervals. Local or strong stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1600–3500 kilocycles.

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. **This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.**

5. Adjust the Volume Control to the desired volume level and set the Tone Range Switch for the preferred tone quality.

6. When through operating, switch off the power by turning the Volume Control knob to the extreme counter-clockwise position.

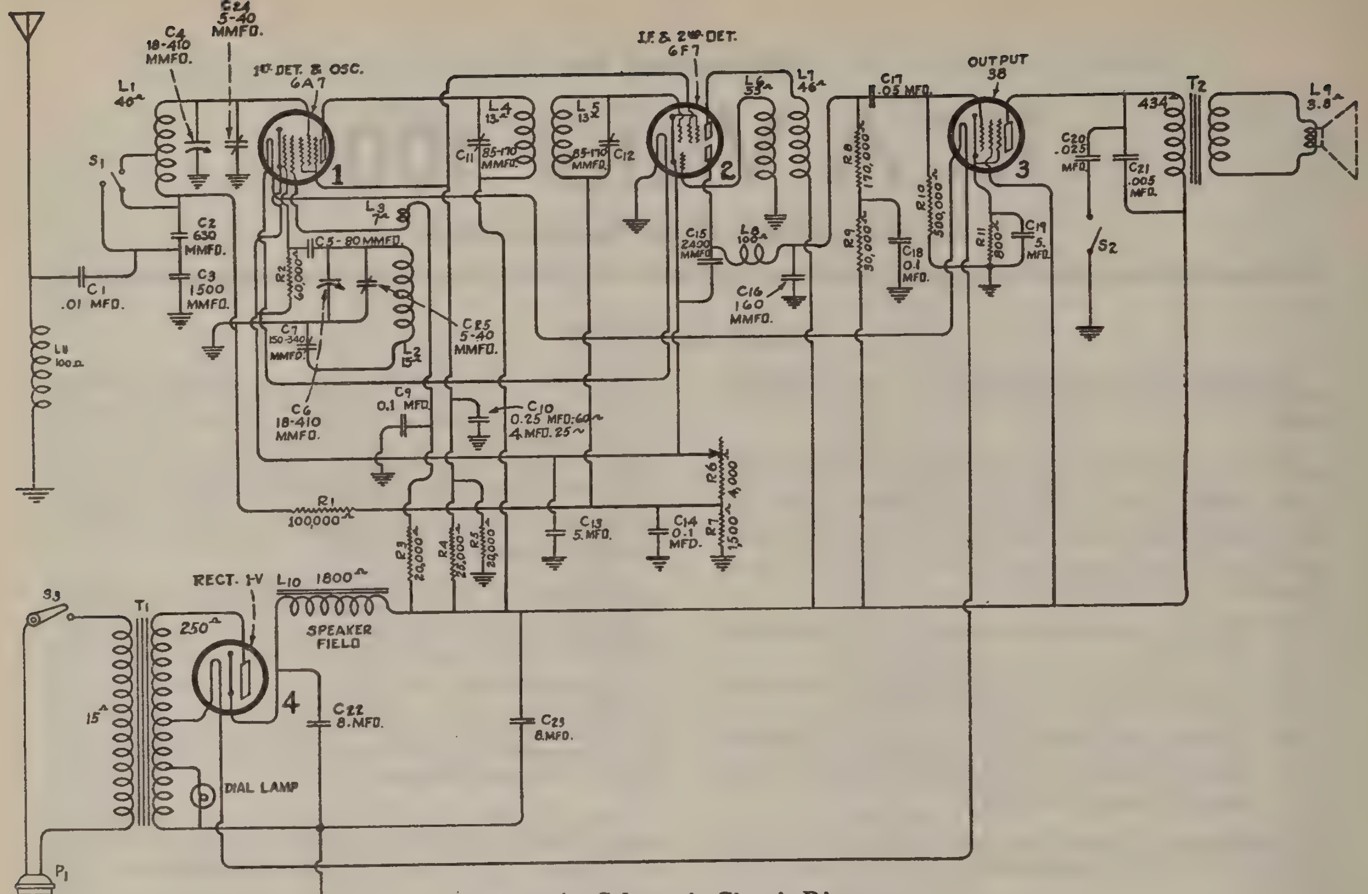


Figure A—Schematic Circuit Diagram

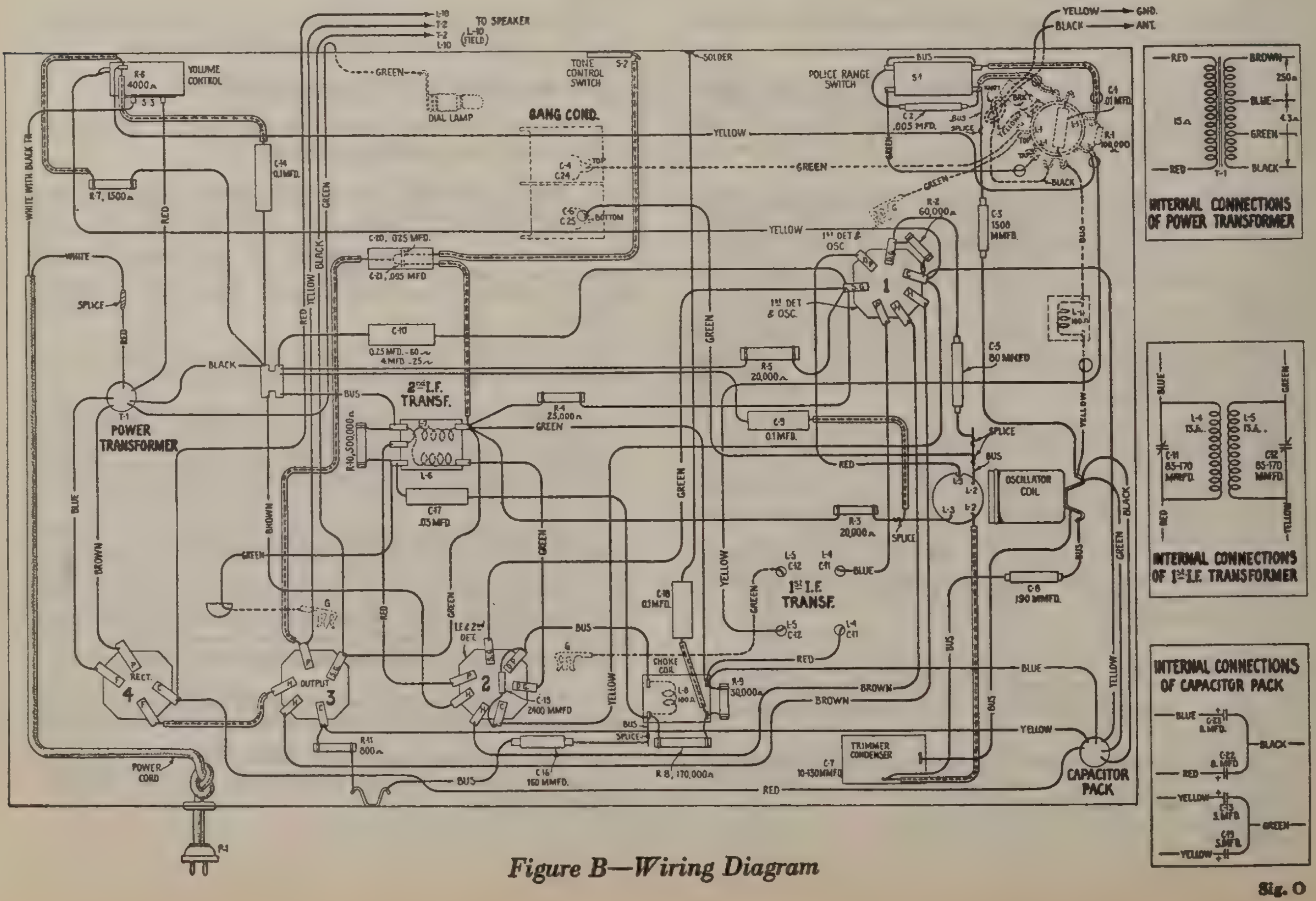


Figure B—Wiring Diagram

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating....................25–60 or 50–60 Cycles
Power Consumption.............................40 Watts
Number and Types of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-38, 1 RCA-1-V
Undistorted Output..............................1.6 Watts
Frequency Range......540–1500 K. C. and 1600–3500 K. C.

This receiver is a four-tube superheterodyne incorporating features such as wide tuning range, electro-dynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

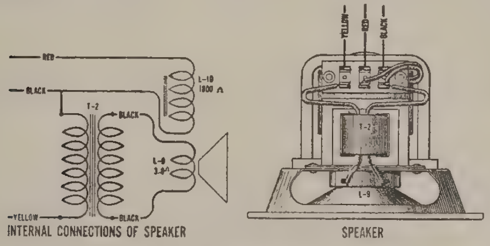


Figure C—Loudspeaker Wiring

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-38.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

RADIOTRON SOCKET VOLTAGES

120 Volt, 60 Cycle Line—Maximum Volume Control Setting

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	First Detector	3.0	95	235	5.0	6.3
	Oscillator	—	—	165	3.5	
RCA-6F7	I. F.	3.0	95	235	7.0	6.3
	Second Detector	20.0	—	150*	0.25	
RCA-38	Output	20.0	240	230	22	6.3
RCA-1-V	Rectifier	—	—	340 RMS	50	6.3

*Actual voltage cannot be measured with ordinary voltmeter. Voltage supplied is 260.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3048	Resistor—500,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C5)	.44
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3592	Knob—Tone control switch knob—Package of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3606	Capacitor—Comprising one 0.005 and one 0.025 mfd. capacitors (C20, C21)	.40
3615	Knob—Volume control or range switch knob—Package of 5	.60
3641	Capacitor—0.1 mfd. (C9)	.35
3701	Capacitor—0.01 mfd. (C1)	.30
3702	Capacitor—0.25 mfd. (C10) (60 cycle)	.42
3713	Capacitor—0.05 mfd. (C17)	.32
3749	Capacitor—0.1 mfd. (C18)	.30
3857	Coil—Detector choke coil (L8)	.90
3858	Socket—Dial lamp socket and bracket	.26
3859	Socket—4-contact Radiotron socket	.30
3860	Socket—5-contact Radiotron socket	.32
3862	Screw—Chassis mounting screw and washer—Package of 4	.24
3865	Capacitor—160 mmfd. (C16)	.30
3868	Resistor—800 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3869	Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3873	Capacitor—1,500 mmfd. (C3)	.30
3877	Capacitor—0.1 mfd. (C14)	.32
3885	Knob—Station selector knob—Package of 5	1.00
3886	Reflector—Dial light reflector	.30
3887	Dial—Station selector dial—Package of 5	$0.60
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3890	Capacitor—190 mmfd. (C8)	.30
3932	Capacitor—2,400 mmfd. (C15)	.30
3933	Capacitor—630 mmfd. (C2)	.32
3942	Shield—Radiotron shield	.18
4000	Capacitor—Adjustable capacitor (C7)	.78
4018	Coil—Choke coil (L11)	.90
4104	Shield—Radiotron shield—1st detector	.20
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
6660	Condenser—2-gang variable condenser	2.78
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6664	Coil—Oscillator coil (L2, L3)	.94
6665	Shield—Oscillator coil shield and mounting bracket	.34
6666	Coil—Antenna coil (L1, C1, R1)	1.08
6667	Volume control (R6, S3)	1.58
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	.50
7487	Shield—Radiotron shield	.25
7641	Capacitor—4.0 mfd. (C10) (25 cycle)	.86
9045	Transformer—Power transformer—105–125 volts—50–60 cycles (T1)	4.84
9047	Transformer—Power transformer—105–125 volts—25–40 cycles	5.25
9048	Transformer—Power transformer—200–250 volts—50–60 cycles	5.50
	REPRODUCER ASSEMBLIES	
6659	Transformer—Output transformer (T2)	1.60
8987	Cone—Reproducer cone (L9)—Package of 5	5.00
9436	Reproducer complete	5.30
9437	Coil assembly—Comprising field coil, magnet and cone support (L10)	2.72

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23574

Printed in U. S. A

Instructions for

RCA Victor 100 and 101

Four-Tube Double-Range Superheterodyne Receivers

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. Before making the necessary external connections, remove the cardboard covers used to protect the two unshielded tubes at the rear of the receiver, then refer to the chassis diagram printed on the license label attached to the cabinet and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the tubes shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the dome terminals of the proper tubes as indicated, and that the spring contact clips are pressed down firmly.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects and run neither close nor parallel to electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length will be found satisfactory. An outdoor antenna of greater length, however, should improve reception and is recommended for use in localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. The ground lead should be as short as possible and attached preferably to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the license label.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

(1) **Power Switch and Volume Control** (Left-hand Knob)—In the extreme counter-clockwise position, the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) **Tone Range Switch** (Lower Middle Knob)—This switch has two positions. The clockwise position provides full-range reproduction. When the knob is turned counter-clockwise, treble response and static interference (when latter is present) will be reduced.

(3) **Station Selector** (Upper Middle Knob)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) **Frequency Range Switch** (Right-hand Knob)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1600–3500 kilocycle range will be received (frequencies in this range are indicated approximately by the small outer numerals), as follows:

  (a) *Police Calls*—At dial settings near "170" for stations transmitting at 1712 kilocycles and between "240" and "260" for stations operating in the 2450 kilocycle band.

  (b) *Amateur Radio "Phone"*—At dial settings between "180" and "200" (assigned band 1800–2000 kilocycles).

  (c) *Aviation Communications "Phone"*—At dial settings above "240" (2500–3500 kilocycles).

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).

2. Apply power by turning the Volume Control knob slightly clockwise from the "off" position until the "on" click of the power switch is heard and the dial is illuminated. Several seconds will be required for the tubes to heat before reproduction is possible. Set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy.

3. Rotate the Station Selector slowly over the range of the dial until a desirable station program is heard.

> NOTE—The majority of stations in the 1600–3500 kilocycle band do not offer continuous programs. Police calls are usually intermittent at regular or irregular intervals. Local or strong stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1600–3500 kilocycles.

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.

5. Adjust the Volume Control to the desired volume level and set the Tone Range Switch for the preferred tone quality.

6. When through operating, switch off the power by turning the Volume Control knob to the extreme counter-clockwise position.

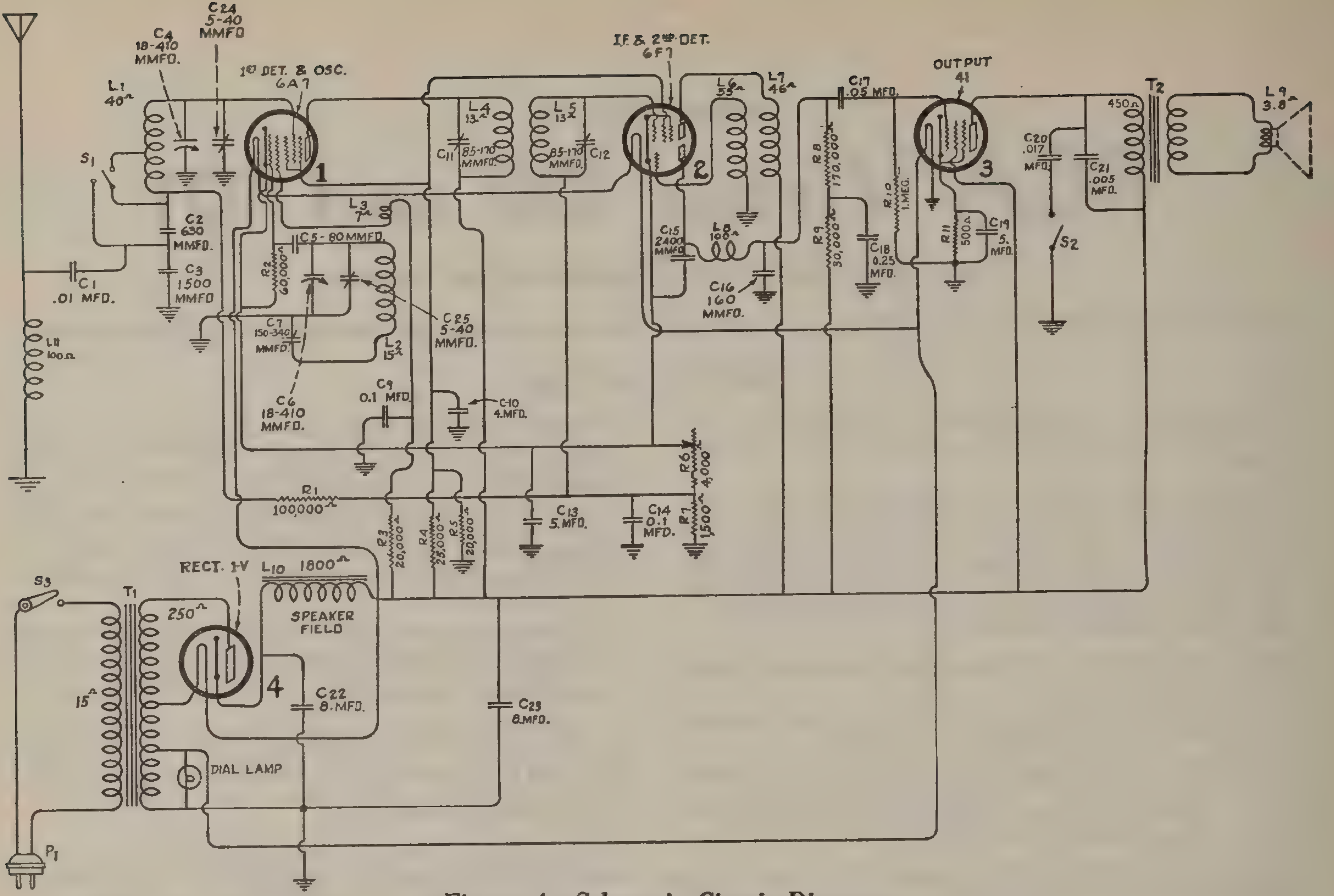


Figure A—Schematic Circuit Diagram

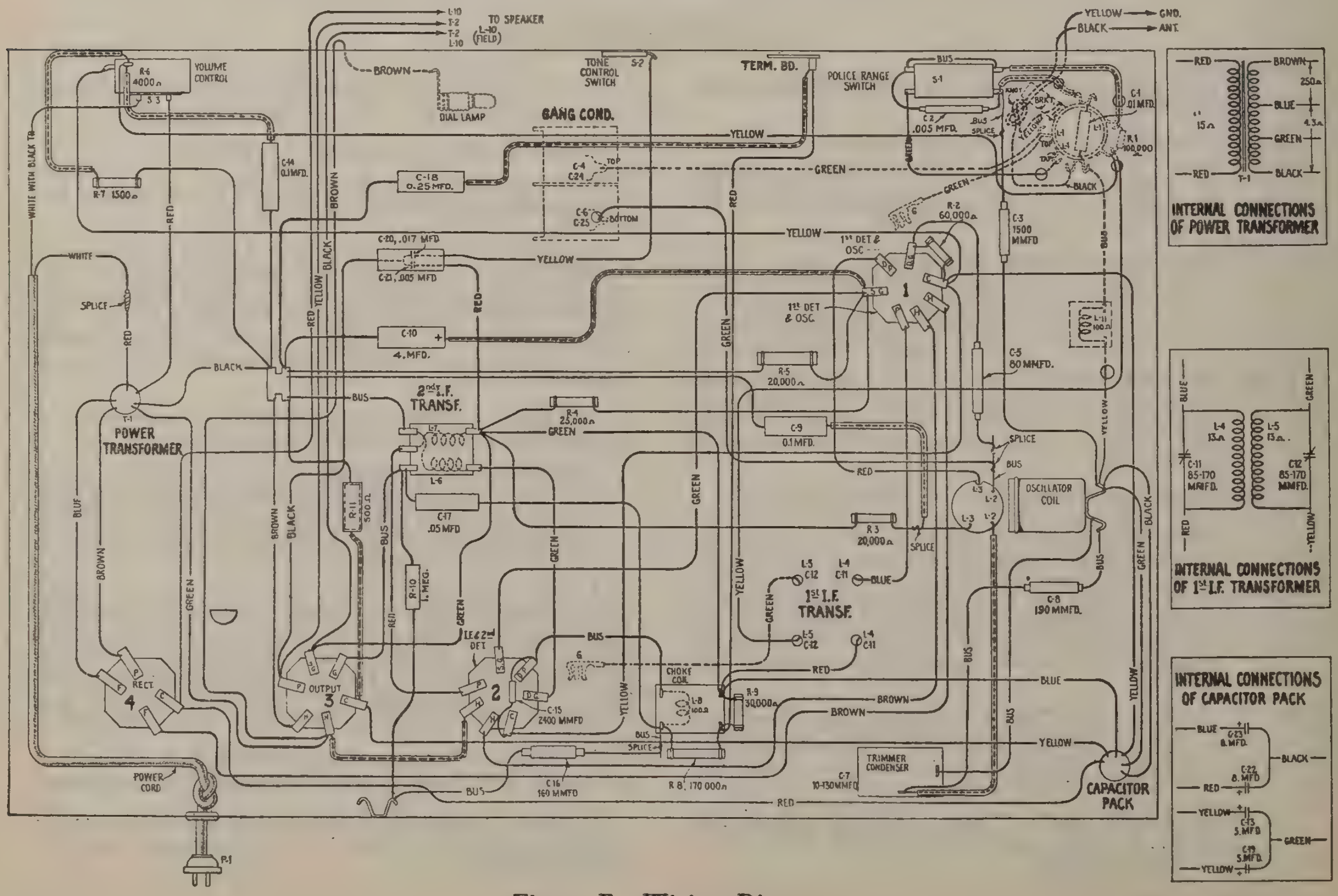


Figure B—Wiring Diagram

SERVICE DATA

Voltage Rating........................... .105–125 Volts
Frequency Rating..................25–60 or 50–60 Cycles
Power Consumption...............................40 Watts
Number and Type of Radiotrons—
1 RCA-6A7, 1 RCA-6F7, 1 RCA-41, 1 RCA-1-V
Undistorted Output..............................1.9 Watts
Frequency Range......540–1500 K. C. and 1600–3500 K. C.

This receiver is a four-tube superheterodyne incorporating features such as wide tuning range, electro-dynamic loudspeaker, two-point tone control, illuminated dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

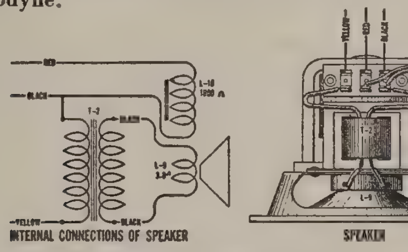


Figure C—Loudspeaker Wiring

The following description of the circuit describes several new design features which are incorporated in this receiver.

The first tube is a combined first detector and oscillator using Radiotron RCA-6A7. Separate tuned circuits are provided for each function. The detector coil is tapped so that the tuning range may be extended merely by shorting out a portion of the coil. The oscillator circuit is not tapped, the high frequency range being obtained by use of its second harmonic instead of the fundamental for obtaining the I. F. frequency.

The next tube is a combined I. F. stage and second detector using Radiotron RCA-6F7. It has two sets of elements, one being used as a screen grid I. F. amplifier and one as a triode detector. The I. F. frequency in this receiver is 460 K. C. The output stage is a single Pentode RCA-41.

The rectifier is an RCA-1-V used in a half-wave rectifying circuit. A feature of this circuit is that only one transformer secondary is used. This is accomplished by having a cathode type rectifier, a series arrangement of filaments and a tapped secondary winding.

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Adjustments

The detector and oscillator line-up trimmer capacitors are adjusted by setting both the dial and an external oscillator first at 1400 K. C. and adjusting the tuning capacitor trimmer capacitors for maximum output, then changing the oscillator frequency and dial setting to 600 K. C. and adjusting the submounted trimmer capacitor for maximum output. The I. F. adjustments are made by adjusting the two trimmer capacitors located on the first I. F. transformer for maximum output when a 460 K. C. signal is connected between the control grid of the first detector and ground. Be sure and set the station selector at a point where no signal is being received when making I. F. adjustments.

RADIOTRON SOCKET VOLTAGES

120 Volt, 60 Cycle Line—Maximum Volume Control Setting—No Signal

Radiotron No.		Cathode to Control Grid, Volts D. C.	Cathode to Screen Grid, Volts, D. C.	Cathode to Plate, Volts D. C.	Plate Current, M. A.	Heater or Filament, Volts
RCA-6A7	First Detector	1.25	70	235	2.5	6.3
	Oscillator	—	—	180	3.5	
RCA-6F7	I. F.	1.25	70	235	5.5	6.3
	Second Detector	19	—	145*	0.4	
RCA-41	Output	17	240	230	26.5	6.3
RCA-1-V	Rectifier	—	—	335 RMS	50	6.3

* Actual voltage cannot be measured with ordinary voltmeter.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R10)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3459	Capacitor—80 mmfd. (C5)	.44
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Oscillator coil retaining ring—Package of 5	.40
3592	Knob—Volume control or range switch knob (Model 100)—Package of 5	.80
3597	Capacitor—.25 mfd. capacitor (C18)	.40
3602	Resistor—6,000 ohms—Carbon type—¼ watt (R2)—Package of 5	1.00
3603	Resistor—500 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
3615	Knob—Tone control knob (Model 100)—Package of 5	.60
3641	Capacitor—0.1 mfd. (C9)	.35
3701	Capacitor—0.01 mfd (C1)	.30
3713	Capacitor—0.05 mfd. (C17)	.32
3857	Coil—Detector choke coil (L8)	.90
3858	Socket—Dial lamp socket and bracket	.26
3859	Socket—4-contact Radiotron socket	.30
3862	Screw—Chassis mounting screw and washer—Package of 4	.24
3865	Capacitor—160 mmfd. (C16)	.30
3869	Resistor—170,000 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3877	Capacitor—0.1 mfd. (C14)	.32
3885	Knob—Station selector knob (Model 100)—Package of 5	1.00
3886	Reflector—Dial light reflector	.30
3887	Dial—Station selector dial—Package of 5	.60
3889	Resistor—25,000 ohms—Carbon type—3 watt (R4)	.25
3932	Capacitor—2400 mmfd. (C15)	.30
3933	Capacitor—630 mmfd. (C2)	.32
4000	Capacitor—Adjustable capacitor (C7)	$0.78
4018	Coil—Choke coil (L11)	.90
4075	Knob—Station selector knob (Model 101)—Package of 5	1.00
4085	Knob—Volume control or range switch knob (Model 101)—Package of 5	.60
4086	Knob—Tone control knob (Model 101)—Package of 5	1.00
4104	Shield—Radiotron shield	.20
6114	Resistor—20,000 ohms—Carbon type—1 watt (R3, R5)—Package of 5	1.10
6660	Condenser—2-gang variable condenser (C4, C6, C24, C25)	2.78
6661	Capacitor pack—Comprising two 5.0 mfd. and two 8.0 mfd. capacitors (C13, C19, C22, C23)	2.70
6662	Transformer—First intermediate frequency transformer (L4, L5, C11, C12)	2.34
6663	Transformer—Second intermediate frequency transformer (L6, L7)	1.06
6664	Coil—Oscillator coil (L2, L3)	.94
6665	Shield—Oscillator coil shield and mounting bracket	.34
6666	Coil—Antenna coil (L1, C1, R1)	1.08
6667	Volume control (R6, S3)	1.58
6668	Switch—Range switch (S1)	.58
6669	Switch—Tone control switch (S2)	.50
6676	Socket—6-contact Radiotron socket	.40
6787	Capacitor—Comprising one .005 mfd. and one .017 mfd. capacitors (C20, C21)	.30
7641	Capacitor—4.0 mfd. (C10)	.86
9464	Transformer—Power transformer—15–125 volts—50–60 cycles (T1)	3.20
9465	Transformer—Power transformer—105–125 volts—25–40 cycles	4.38
9466	Transformer—Power transformer—200–250 volts—50–60 cycles	3.28
	REPRODUCER ASSEMBLIES	
6788	Transformer—Output transformer (T2)	1.60
8987	Cone—Reproducer cone (L9)—Package of 5	5.00
9467	Reproducer complete	5.15
9437	Coil assembly—Comprising field coil, magnet and cone support (L10)	2.72

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor 110, 111 and 115

Five-Tube Double-Range Superheterodyne Receivers

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet. Because of its small size and light weight, the set may be placed upon a mantel or article of furniture such as a piano or end-table. Care should be taken, however, to *avoid restriction of natural ventilation* as would occur with the set situated so that its back is flush with a wall of the room; for this reason, also, the small chest-type instrument should not be fitted into a small compartment. The cabinet must be mounted only in the normal upright position to insure proper ventilation and maximum life of the tubes.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects and run neither close nor parallel to electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length will be found satisfactory. An outdoor antenna of greater length should improve reception and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set therefore is ready to operate when it is removed from the carton and external connections are made as heretofore described.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Refer to the tube location diagram on the rating label and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

NOTE—Because of the small clearance above the tubes in the chest-type cabinet model, the chassis must be entirely removed from the cabinet in order to test or replace the Radiotrons. To permit withdrawal of the chassis, it is necessary to take off the four knobs on the front panel and remove the four bolts through the bottom of the cabinet. When it is desired to have the tubes tested in a chest model, it is recommended that the complete instrument be taken to a reputable dealer, who will generally be glad to remove and test the Radiotrons without charge except for necessary tube replacements.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Tone Control* (Middle Knob)—In the extreme clockwise position, full-range reproduction is obtained. Counter-clockwise rotation of the knob serves to decrease high-frequency (treble) response and also to reduce static interference.

(3) *Station Selector* (Right-hand Knob—Symmetrical with Volume Control)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) *Frequency Range Switch* (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400–2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:

(a) **Police Calls**—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118–122" for stations operating in the 2450 kilocycle band.

(b) **Amateur Radio "Phone"**—At dial settings "90–95" (assigned band 1900–2000 kilocycles).

(c) **Aviation Reports, Airport Beacons, etc.**—At dial settings "95–118" (assigned band 2000–2400 kilocycles).

(d) **Amateur Radio "CW" (Code)**—At dial settings "80–90" (assigned band 1715–1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).

2. Turn on the power and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy after allowing approximately one-half minute for the tubes to heat.

3. Rotate the Station Selector slowly over the range of the dial until a desirable station program is heard.

NOTE: The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

4. For best reproduction, reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.

5. Set the Tone Control for the preferred tone quality.

6. When through operating, switch off the power by turning the Volume Control knob to the extreme counter-clockwise position.

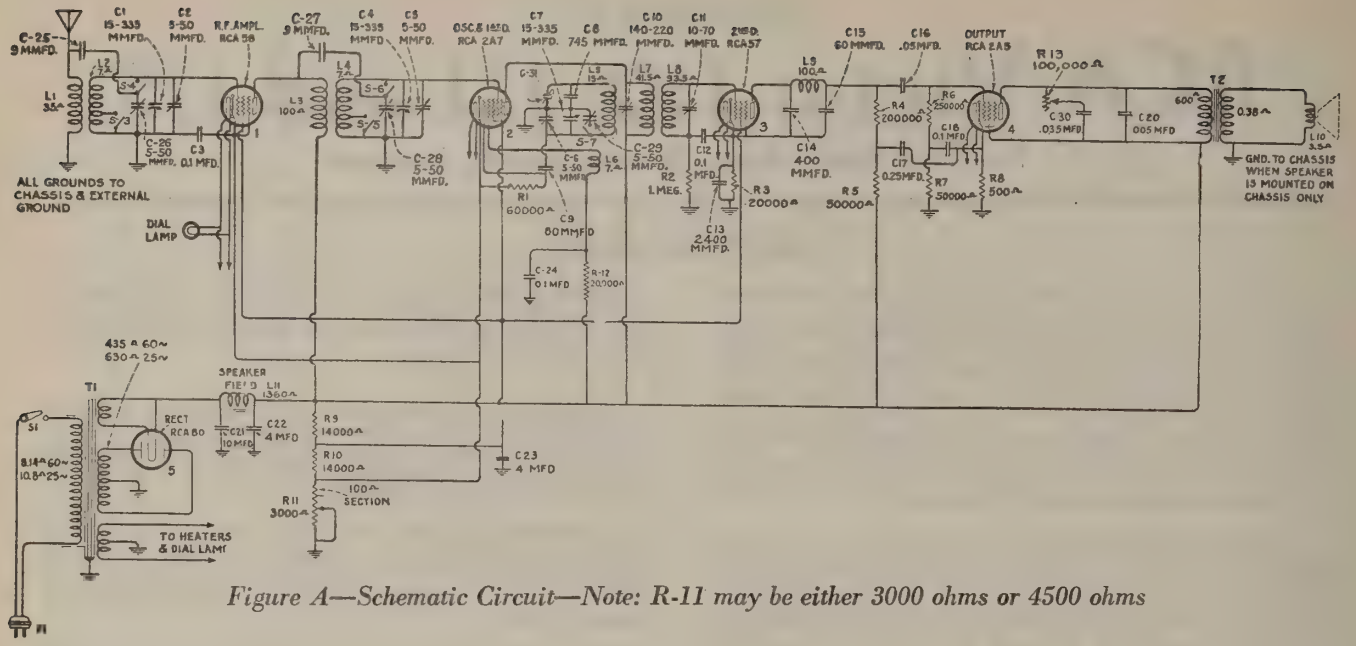


Figure A—Schematic Circuit—Note: R-11 may be either 3000 ohms or 4500 ohms

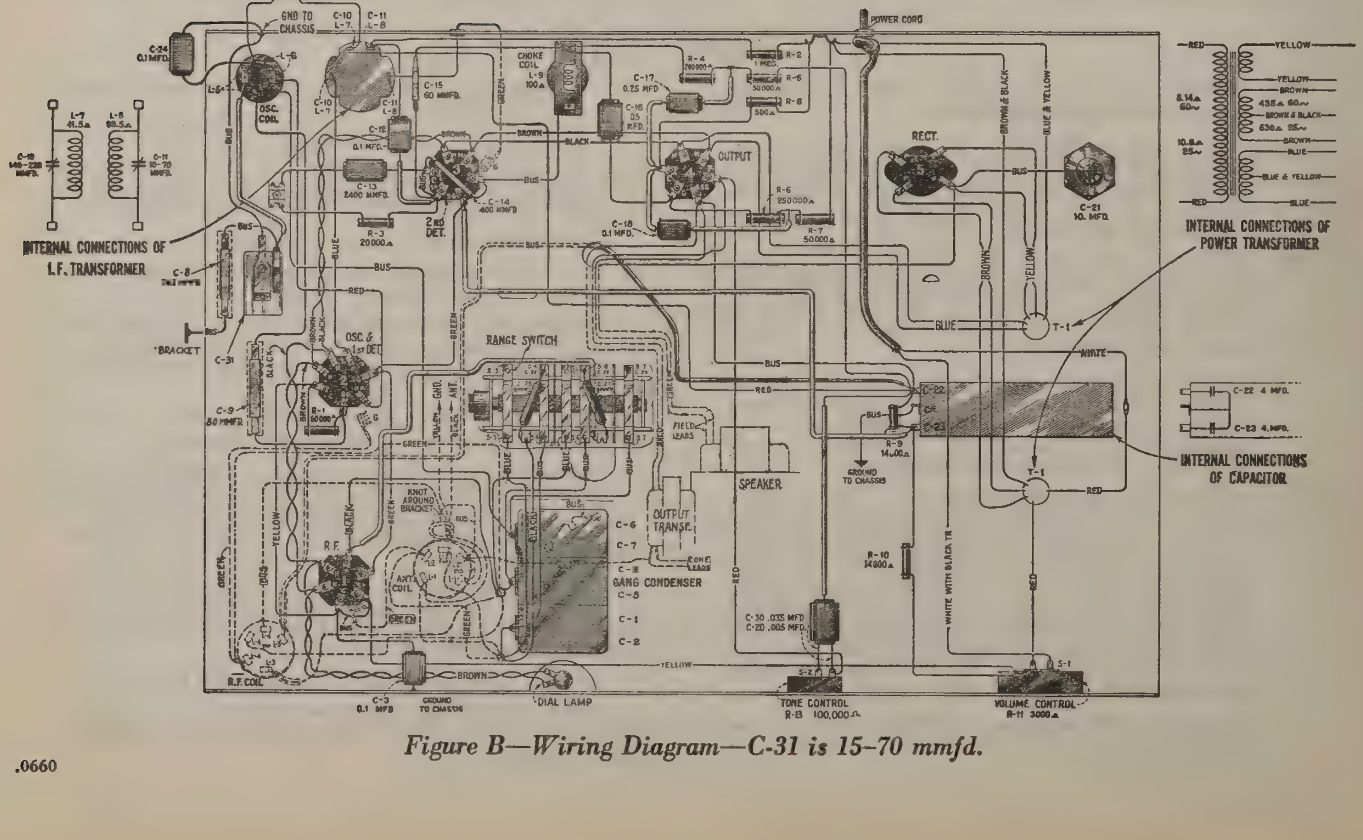


Figure B—Wiring Diagram—C-31 is 15–70 mmfd.

SERVICE DATA

Voltage Rating....................105–125 Volts
Frequency Rating..........25–60 Cycles and 50–60 Cycles
Power Consumption..................60 Cycles—70 Watts
Number and Types of Radiotrons..............1 UX-280, 1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output..........................1.75 Watts
Frequency Range..................540 K. C. to 1500 K. C. and 1400 K. C. to 2800 K. C.

This receiver is a five-tube Superheterodyne incorporating a dynamic loudspeaker as a part of the chassis; continuously variable tone control; single heater type Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic and Figure B the wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 600 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used to that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, located at the bottom of the chassis, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.

(e) Change the frequency of the oscillator to 1400 K. C. and set the dial at 140. Again make the adjustments given under (c).

(f) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

RADIOTRON SOCKET VOLTAGES

115 Volt, A. C. Line. MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater, Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers.

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2734	Capacitor—745 mmfd. (C8)—Package of 5	$1.50
3050	Resistor—14,000 ohms—Carbon type—3 watts (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt (R2)—Pkg. of 5	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3472	Capacitor—0.0024 mfd. (C13)	.32
3555	Capacitor—0.1 mfd. (C24)	.36
3572	Socket—Seven contact Radiotron socket	.38
3573	Socket—Four contact Radiotron socket	.32
3574	Coil—Choke coil (L9)	.68
3575	Dial lamp socket with bracket	.34
3584	Ring—R. F. or oscillator coil retaining ring—Pkg. of 5	.40
3590	Escutcheon—Station selector escutcheon—Pkg. of 5	1.40
3591	Escutcheon—Name plate escutcheon—Pkg. of 5	1.40
3592	Knob—Station selector, volume control or tone control knob—Pkg. of 5	.80
3594	Resistor—50,000 ohms—carbon type—½ watt (R5, R7)—Pkg. of 5	1.00
3596	Capacitor—60 mmfd. (C15)	.36
3597	Capacitor—0.25 mfd. (C17)	.40
3602	Resistor—60,000 ohms—carbon type—¼ watt (R1)—Pkg. of 5	1.00
3604	Capacitor—400 mmfd. (C14)	.30
3615	Knob—Range switch knob—Pkg. of 5	.60
3623	Shield—Antenna or R. F. coil shield	.30
3632	Resistor—500 ohms—carbon type—1 watt (R8)—Pkg. of 5	1.10
3641	Capacitor—0.1 mfd. (C3, C12, C18)	.35
3713	Capacitor—.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd. (C25, C27)—Pkg. of 2	.50
3842	Screw—Chassis mounting screw assembly—Package of 4	.26
3942	Shield—Radiotron shield—oscillator	.18
6228	Resistor—200,000 ohms—carbon type—½ watt (R4)—Pkg. of 5	1.00
6303	Resistor—20,000 ohms—carbon type—½ watt (R12, R3)—Pkg. of 5	1.00
6306	Resistor—14,000 ohms—carbon type—1 watt (R10)—Pkg. of 5	$1.10
6464	Transformer—I. F. transformer (C10, C11, L7, L8)	1.88
6465	Volume control (R11)	1.22
6471	Coil—Oscillator coil (L5, L6)	.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil (L3, L4)	.94
6620	Capacitor—Comprising one .005 and one .035 mfd. (C20, C30)	.50
6622	Dial—Condenser dial and drive assembly	.95
6623	Tone control (R13)	1.25
6624	Condenser—3-gang variable tuning condenser	3.50
6625	Switch—Range switch	1.60
6676	Socket—6-contact Radiotron socket—Output tube	.40
6754	Knob—Tone control or range switch knob (Moderne)—Package of 5	.60
6771	Knob—Station selector or volume control knob (Moderne)—Package of 5	.85
7062	Capacitor—Adjustable—15–70 mmfd.	.50
7063	Capacitor—Adjustable—5 to 40 mmfd. (C31)	.50
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—Radiotron shield—R. F. or 2nd Detector	.25
7589	Capacitor—Comprising two 4.0 mfd. capacitors (C22, C23)	1.64
7590	Capacitor—10 mfd. (C21)	1.40
8985	Transformer—Power transformer 105–125 volts, 50–60 cycles (T1)	4.26
8986	Transformer—Power transformer 200–250 volts, 50–60 cycles (T1)	4.38
9002	Transformer—Power transformer 105–125 volts, 25–50 cycles (T1)	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer (T2)	1.44
8987	Cone—Reproducer cone (L10)—Pkg. of 5	5.00
8988	Coil assembly—Comprising field coil, magnet and cone support (L11)	2.35
9435	Reproducer complete	4.75

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23557

Printed in U. S. A.

Instrucciones para el Modelo 112

Receptor Universal para C.A. o C.C. de 220 Voltios

Superheterodino de Cinco Tubos, Tipo de Mesa

INSTALACIÓN

Sitio para el Aparato—Este receptor debe colocarse sobre una superficie plana, como por ejemplo una mesa o un tablero, y cerca de las entradas de la antena y tierra, así como próximo a un toma-corriente. Cualquiera que sea la instalación que se haga, debe tenerse mucho cuidado de no impedir la ventilación natural del mueble, como ocurriría si se colocara su parte posterior muy junto a una pared o contra cualquier otra superficie vertical plana. Para evitar daño al acabado del mueble y posiblemente al circuito que contiene, no debe colocarse este radio sobre un aparato de calefacción ni demasiado cerca de cualquier artículo que produzca calor.

Antena y Tierra—Se recomienda una antena exterior de 7.5 a 22.5 metros de longitud, incluyendo el hilo de entrada y el hilo a tierra. Sin embargo, en muchos casos una antena interior de longitud corta o mediana dará resultados satisfactorios en edificios que no sean de construcción metálica. La antena debe aislarse perfectamente de todo objeto y no debe instalarse ni cerca ni paralelamente a circuitos eléctricos dentro o fuera del edificio.

Sólo haciéndose una *buena* conexión a tierra podrá conseguirse un funcionamiento superior. La conexión a tierra debe ser lo más corta y directa posible y con preferencia debe hacerse a la tubería de agua fría. La superficie de la tubería debe limarse para que quede absolutamente limpia, y recomendamos el uso de una pinza especial para que la conexión resulte apretada y permanente.

Se han provisto dos hilos flexibles en la parte de atrás del receptor para las conexiones a la antena y a tierra. Conéctese el hilo *negro* al hilo de entrada de la antena y el *amarillo* al hilo a tierra. Ambas conexiones deben soldarse y cubrirse con tira de aislar.

Suministro de Energía—Conéctese el cordón de la energía a un toma-corriente que indique un voltaje (sea C.A. o C.C.) que esté dentro de los límites especificados en la etiqueta de licencia, pegada en el panel de atrás del instrumento. Este instrumento no debe hacerse funcionar nunca con una corriente cuyo voltaje exceda del límite máximo (230 voltios). En caso de duda sobre el voltaje exacto de la corriente, consulte este particular con la Compañía de Electricidad de la localidad.

Radiotrons—Este instrumento se ha equipado y probado en la fábrica con Radiotrons RCA y se despacha con los tubos en sus respectivos enchufes. Por lo tanto, este receptor estará listo para funcionar cuando se haya desempacado cuidadosamente y las conexiones externas se hayan hecho conformes a las instrucciones que anteceden.

Si, al instalarse, el receptor no funciona bien o deja de funcionar, uno o más tubos, corazas o contactos de tope se habrán aflojado durante el transporte. Sáquese el panel de atrás del mueble (sostenido en su posición por medio de tornillos en los bordes), luego consúltese el diagrama de la distribución de tubos que aparece en la etiqueta de graduación y ***cerciórese*** de lo siguiente:

(a) Que cada tubo esté en el enchufe que le corresponde y que todos hayan sido introducidos firmemente hasta el fondo. Nunca aplique la corriente al aparato hasta que todos los tubos estén en sus lugares respectivos.

(b) Que todas las corazas o pantallas metálicas tubulares estén firmemente colocadas encima de los tubos que protegen (estos tubos están indicados por un círculo doble en el diagrama).

(c) Que los conectadores de resorte de los hilos cortos y flexibles (rejilla), que se muestran en el diagrama, estén firmemente unidos a los contactos o terminales de tope de los Radiotrons respectivos, y que los mismos no estén torcidos de tal modo que haya un contacto con cualquiera de la corazas tubulares.

NOTA—El hilo de rejilla para el Radiotron RCA-6A7 debe quedar suspendido sobre el soporte ranurado, según se ilustra, a fin de obtener un funcionamiento satisfactorio.

FUNCIONAMIENTO

Controles—Este instrumento tiene dos controles para su funcionamiento, los cuales se hallarán en el panel de enfrente del mueble, y son como sigue:

(1) ***Control de Volumen—Combinado con el Interruptor de la Energía*** (Perilla de la Izquierda)—Girada hasta el fin hacia la izquierda, esta perilla desconectará toda la energía. Haciéndola girar levemente hacia la derecha, se aplicará energía, según lo indicará la iluminación del cuadrante. Haciéndola girar más se aumentará gradualmente el volumen.

(2) ***Selector de Estaciones*** (Perilla de la Derecha)—Este control está provisto de un cuadrante debidamente calibrado, el cual facilita la sintonización e identificación de las estaciones (agréguese un cero a los numerales de la escala para obtener la frecuencia en kilociclos).

Modo de Proceder—Para hacer funcionar este receptor, hágase lo siguiente:

1. Aplíquese la corriente y hágase girar hacia la derecha la perilla del Control de Volumen para conseguir un volumen máximo. Redúzcase esta graduación si la reproducción es demasiado potente (déjense pasar unos segundos para el calentamiento de los tubos).

2. Hágase girar el Selector de Estaciones, poco a poco en todo el recorrido del cuadrante, hasta que se oiga el programa de la estación que se desee.

MUY IMPORTANTE—Si no se oye nada que venga del altoparlante (sea señal de radio o interferencia de la estática) al hacer funcionar el aparato con Corriente Continua, cámbiese en sentido contrario la posición del tapón conector en el toma-corriente.

3. Para obtener una reproducción perfecta, redúzcase la graduación del Control de Volumen y ajústese con todo cuidado el Selector de Estaciones para el volumen máximo. Úsese siempre el Control de Volumen—nunca el Selector de Estaciones—para regular el volumen.

4. Cuando se desee que el instrumento cese de funcionar, córtese la corriente, haciendo girar la perilla del Control de Volumen hacia su posición máxima de la izquierda.

Instructions for Model 112

220 Volt AC/DC Universal Receiver

Five-Tube Superheterodyne Table Model

INSTALLATION

Location—The receiver should be supported upon a level surface such as a table or shelf, convenient to an electrical outlet and to the antenna lead-in and ground wires. In any installation, care should be taken to avoid restriction of natural ventilation through the cabinet as would occur with the back of the set placed too close to a wall or other plane surface. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device.

Antenna and Ground—An outdoor antenna having a length of from 25 to 75 feet, including the lead-in and ground connections, is recommended. In many cases, however, an indoor antenna of short or medium length will be found satisfactory in buildings of non-metallic construction. The antenna should be well insulated from all objects and run neither close nor parallel to electrical circuits inside or outside the building.

A good ground connection is essential for best performance. The ground lead should be as short as possible and preferably attached to a cold water pipe. The pipe surface should be scraped clean an an approved ground clamp used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet upon which is impressed a supply voltage (either AC or DC) within the limits specified on the license label attached to the rear panel of the instrument. Never operate the instrument from a supply voltage exceeding the maximum limit (230 volts). Consult your local power company if in doubt as to the actual voltage available.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in their sockets. The set therefore is ready to operate when it is removed from the carton and external connections are made as heretofore described.

If, when first installed, the receiver either performs imperfectly or fails to operate, it is probable that one or more of the tubes, shields or dome terminal clips have been jarred loose in shipment. Remove the cabinet rear panel (held in place by screws at the edges), then refer to the tube location diagram printed on the license label and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. Never apply power to the instrument unless all Radiotrons are in place.

(b) That all shields are rigidly in place over the Radiotrons represented by double circles on the diagram.

(c) That the spring connectors of the short flexible (grid) leads shown on the diagram are securely attached to the dome terminals of the proper Radiotrons and are not bent to an extent where contact with any tube shield is established.

NOTE—The grid lead for Radiotron RCA-6A7 must be suspended over the notched support as illustrated, in order to insure proper operation.

OPERATION

Controls—The instrument has two operating controls located on the front panel of the cabinet as follows:

(1) *Volume Control—Combined with Power Switch* (Left-hand Knob)—In the extreme counter-clockwise position, the power is "off." A slight clockwise rotation turns the power "on," as indicated by illumination of the dial; further rotation increases the volume.

(2) *Station Selector* (Right-hand Knob)—This control is provided with a dial calibrated to facilitate the location and identification of stations (add one cipher to scale markings to obtain the frequency in kilocycles).

Procedure—To operate the receiver, proceed as follows:

1. Turn the power "on" and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy after allowing a few seconds for the tubes to heat.

2. Rotate the Station Selector slowly over the range of the dial until a desirable station program is heard.

IMPORTANT—If no sounds (station signals or static) are heard on DC supply, reverse the prongs of the power plug in the receptacle.

3. For best reproduction, reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.

4. When through operating, turn the Volume Control knob fully counter-clockwise, thus switching "off" the power.

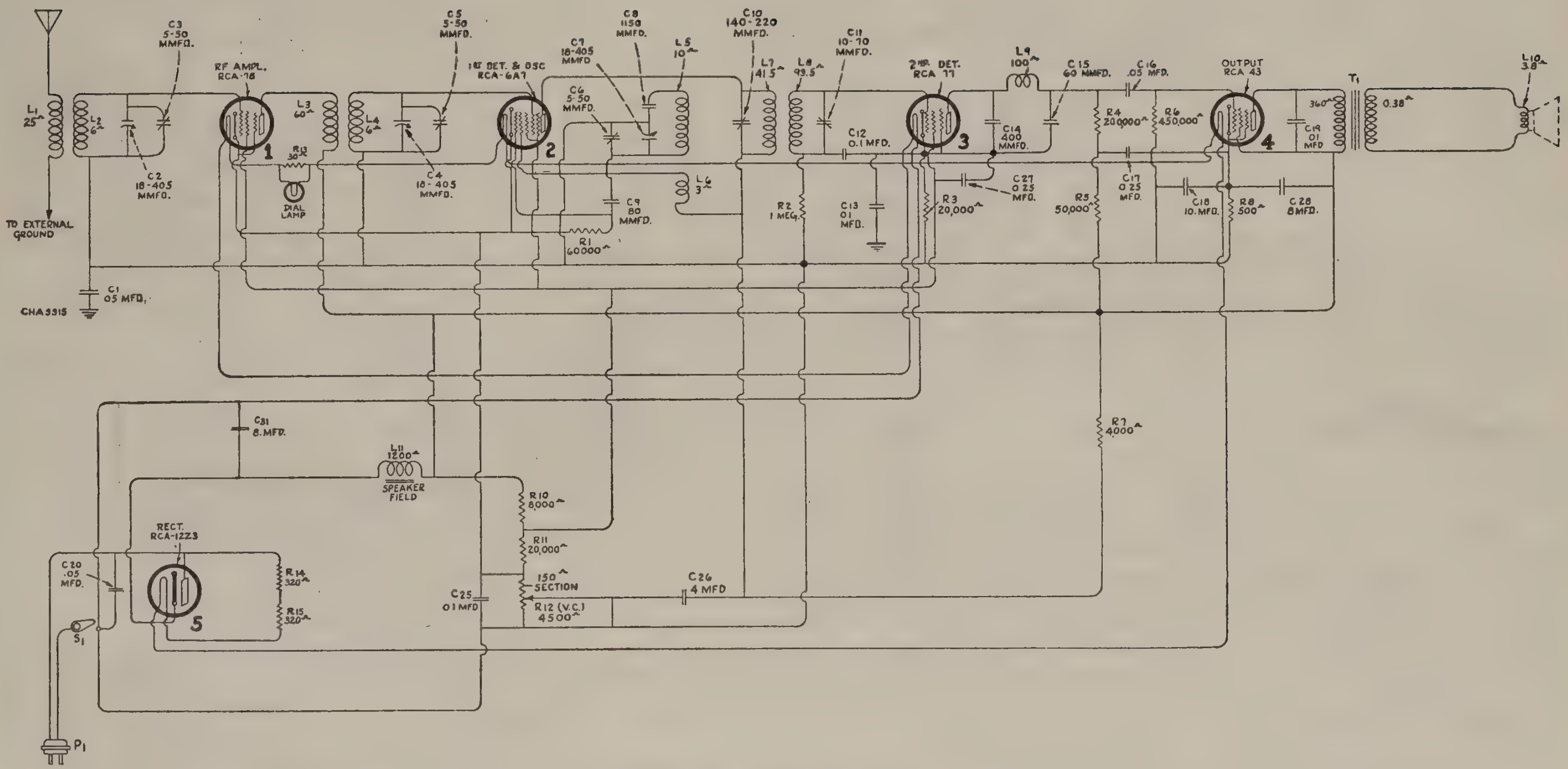
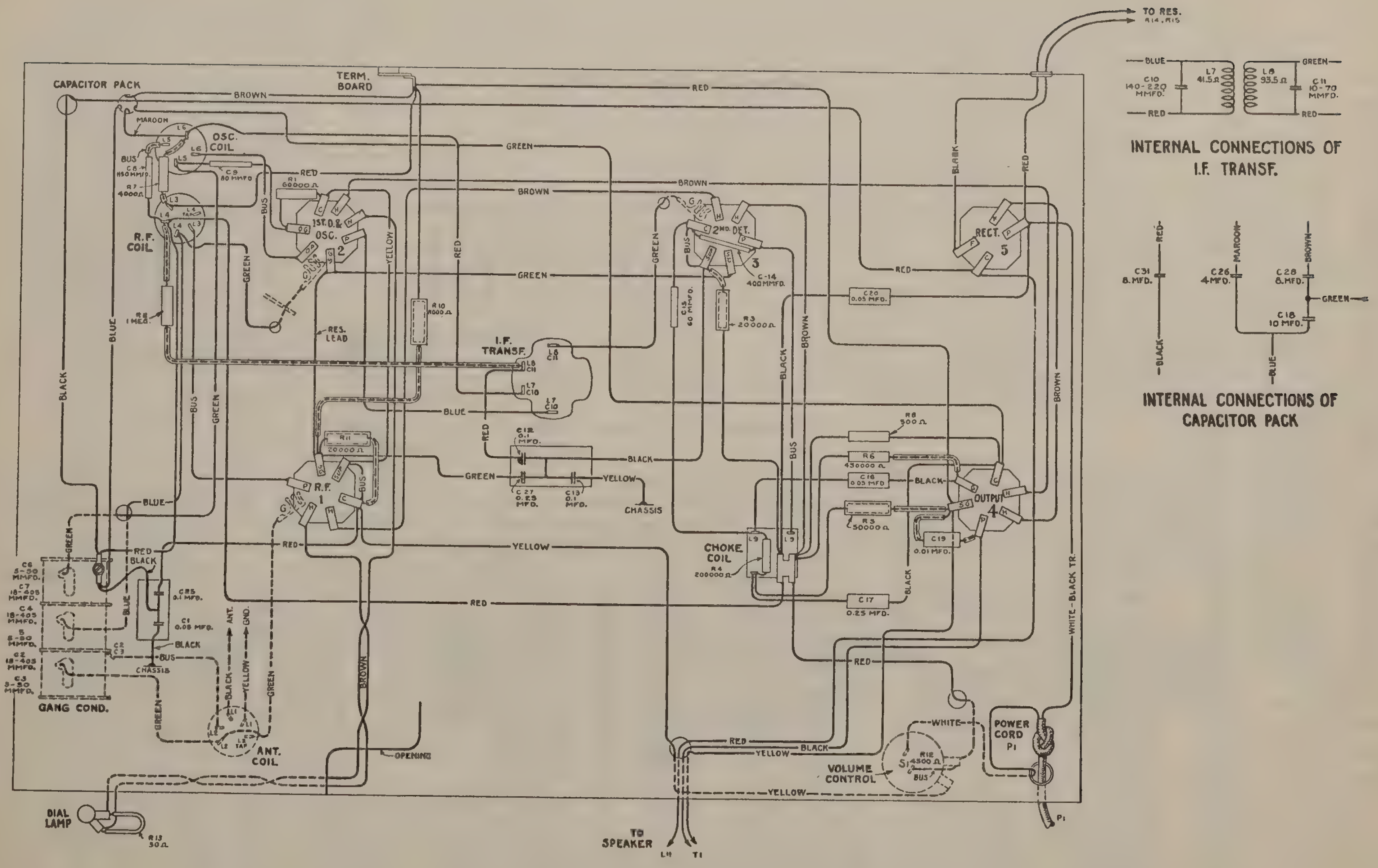


Figure A—Schematic Diagram


INTERNAL CONNECTIONS OF I.F. TRANSF.

INTERNAL CONNECTIONS OF CAPACITOR PACK

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	200–230 AC or DC
Frequency Rating (AC)	50–60 Cycles
Power Consumption	AC 60 Cycles–105 Watts—DC–85 Watts
Number and Types of Radiotrons	1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-12Z3—Total 5
Undistorted Output	1.5 Watts
Frequency Range	540 KC–1500 KC

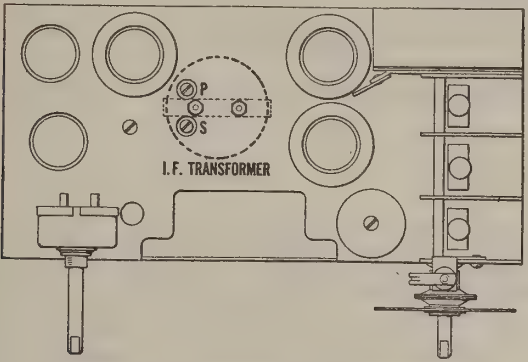


Figure C—Location of Line-Up Capacitors

This receiver is a five tube Super-Heterodyne designed to operate on AC or DC over the voltage and frequency range indicated. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-12Z3 which is used in a half-wave circuit.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and for the R. F. circuits should be made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 KC. and 1400 KC. An output meter and non-metallic screw driver are also necessary. The Stock No. 9050 test oscillator and Stock No. 7065 screw driver are suitable for this purpose. Figure C shows the location of the I. F. capacitors.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 KC., coupling its output between the control grid of the first detector and ground, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the R. F. and oscillator circuits are adjusted at 1400 KC. Prior to making the adjustment, however, the dial should be checked. This is done by making sure the dial indicator reads 530 when the tuning capacitor rotor plates are fully meshed with the stator plates. The adjustments are then made in similar manner as that of the I. F. except that the oscillator is set at 1400 KC., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

RADIOTRON SOCKET VOLTAGES

*Measured at 220 Volts A. C., 60 Cycles (Maximum Volume Control)

Radiotron No.	Cathode to Control Grid, Volts DC	Cathode to Screen Grid, Volts DC	Cathode to Plate, Volts DC	Plate Current M. A.	Heater Volts
RCA-78 R. F.	3.0	100	165	5.5	6.0
RCA-6A7 Oscillator 1st Detector	—	—	145	1.7	6.0
	3.0	100	145	2.5	—
RCA-77 2nd Detector	Plate and Bias Supply 165 Volts			—	6.0
RCA-43 Power	21.0	140	130	35.0	25.0
RCA-12Z3 Rectifier	220 RMS			—	12.0

*Voltages with 220 Volts D. C. supply will be approximately 10 per cent less than tabulated values

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
2875	Knob—Volume control or station selector knob—Package of 5	1.50
2963	Resistor—8,000 ohms—Carbon type—1 watt (R10)—Package of 5	1.10
3033	Resistor—1 megohm—Carbon type—¼ watt (R2)—Package of 5	1.00
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna, RF or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3623	Shield—Antenna, RF or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt (R8)—Package of 5	1.10
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3701	Capacitor—.01 mfd. (C19)	.30
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3754	Capacitor—1,150 mmfd. (C8)	.50
3755	Capacitor—Comprising two .1 mfd. and one .25 mfd. (C12, C13, C27)	.60
3859	Socket—4-contact Radiotron socket	.30
3888	Capacitor—.05 mfd. (C16)	.25
3914	Resistor—30 ohms—Flexible type (R13)	.28
3915	Resistor—Porcelain type—320 ohms (R14, R15)	.88
3916	Capacitor—.05 mfd. (C20)	.32
3917	Capacitor—.25 mfd. (C17)	.40
3919	Socket—Dial lamp socket	.28
3950	Shield—Radiotron shield	.26
3993	Screw—No. 6-32 square head set screw for condenser dial and drive assembly—Package of 10	$0.25
4005	Escutcheon—Volume control escutcheon	.42
6114	Resistor—20,000 ohms—Carbon type—1 watt (R11)—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6250	Resistor—4,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
6519	Coil—Antenna coil (L1, L2)	.88
6520	Coil—RF coil (L3, L4)	.94
6521	Coil—Oscillator coil (L5, L6)	.60
6621	Capacitor—Comprising one .05 and one .1 mfd. (C1, C25)	.46
6676	Socket—6-contact Radiotron socket	.40
6723	Condenser—3-gang variable tuning condenser (C2, C3, C4, C5, C6, C7)	4.15
6724	Volume control (R12, S1)	1.20
6725	Dial—Tuning condenser dial and drive assembly	.88
6726	Coil—Choke coil (L9)	.62
6727	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.68
6728	Capacitor—Comprising one 4.0 mfd., one 10.0 mfd. and two 8.0 mfd. (C18, C26, C28, C31)	2.94
7065	Screwdriver—For IF, RF and oscillator condenser adjustment	.80
7485	Socket—6-contact Radiotron socket—Second detector	.40
7822	Escutcheon—Station selector escutcheon	.42
9050	Oscillator—Test oscillator 15–20,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
6730	Transformer—Output transformer (T1)	1.52
9428	Cone—Reproducer cone (L10)—Package of 5	5.00
9447	Reproducer complete	5.25
9448	Coil—Field coil magnet and cone support (L11)	2.74

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23590

Printed in U. S. A.
Sig. P

Instructions for

RCA Victor 114

Five-Tube Superheterodyne, 115 Volt AC/DC Universal Receiver

INSTALLATION

Preliminary—After unpacking the instrument, refer to the tube location diagram on the label attached to the bottom of the cabinet; make certain that all tubes are rigidly in position and that the spring clips of the three short flexible (grid) leads are firmly connected to the dome terminals of the proper Radiotrons. *The RCA-78 and RCA-6A7 grid leads must be suspended over the notched supports* as indicated in the diagram, in order to obtain proper operation.

Location—The receiver should be located so that its power cord is within reach of an electrical outlet or lamp socket of the proper rating. Because of its light weight and small size, the instrument may be mounted upon a convenient shelf or upon an article of furniture (such as a piano or end-table) if desired. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device.

Antenna and Ground—For use as a portable receiver, the attached antenna (flexible black lead approximately 20 feet in length) will normally provide good reception of local and semi-distant stations. The antenna wire should be uncoiled to full length and suspended as high as possible. When the receiver is used in a building of metallic construction an outdoor antenna is essential. In such cases, sufficient pickup often may be obtained with the attached antenna lead dropped from a nearby window. For any permanent installation, however, a regulation outdoor antenna from 25 to 75 feet in length is recommended.

A *good* ground connection is essential for best performance. Splice a wire of the required length (flexible insulated copper wire recommended) to the short black lead extending from the receiver chassis; wrap the joint with insulating tape. The ground wire should be as short as possible and preferably attached to a cold water pipe by means of an approved ground clamp.

Power Supply—Before connecting the power cord to the electrical outlet, make certain (1) that the supply voltage does not exceed 125 volts and (2) that the A. C.–D. C. line switch at the rear of the chassis is correctly set as indicated in the tube location diagram on the bottom of the cabinet—to the right (facing rear of set) for A. C. and to the left for D. C. supply.

> NOTE—The power cord is of special construction and should not be shortened, tampered with, bent sharply or replaced with standard cord. It is normal for this cord to become slightly warm during operation of the receiver. If, at any time, the receiver fails to operate and the cord does not become properly warm, return the complete instrument to your dealer for installation of a new cord of the same type.

OPERATION

The instrument has three operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—In the extreme counter-clockwise position the power is "off." A slight clockwise rotation of the knob turns the power "on," further rotation serving to increase the volume.

(2) *Station Selector* (Right-hand Knob—Symmetrical with Volume Control)—This control is provided with an escutcheon upon which is embossed an arbitrary (0–100) graduated scale. Stations of low frequency (540 kilocycles and upward) will be received toward the "100" end of the scale. Police calls from stations transmitting at 1712 kilocycles will be received near the "0" end of the scale.

(3) *Frequency Range Switch* (Small Knob Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, stations operating in the range from 540 to 1712 kilocycles will be received. Reception of police calls from stations in the 2400–2500 kilocycle band will be obtained with this knob in the *clockwise* position.

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (3).
2. Turn the power "on" and set the Volume Control fully clockwise for maximum volume—reduce the setting if too noisy after allowing a few seconds for the tubes to heat.
3. Rotate the Station Selector slowly over the range of the dial until a desirable station program (or police call) is heard. *If no sounds (station signals or static) are heard on D. C. supply, reverse the prongs of the power plug in the receptacle.*

   NOTE—Police calls in the 2400–2500 kilocycle band will be heard at dial settings between "25" and "50," approximately (each station in this band will be heard at two separate points within this portion of the dial range—the setting which provides the clearer reception should be used). The remainder of the dial range is ineffective with the Frequency Switch set for reception of this band. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 2400–2500 kilocycles.
4. For best reproduction reduce the Volume Control setting and adjust the Station Selector accurately for loudest volume. Always use the Volume Control—never the Station Selector—for regulation of volume.
5. When through operating, turn the Volume Control knob counter-clockwise until the "off" click of the power switch is heard.

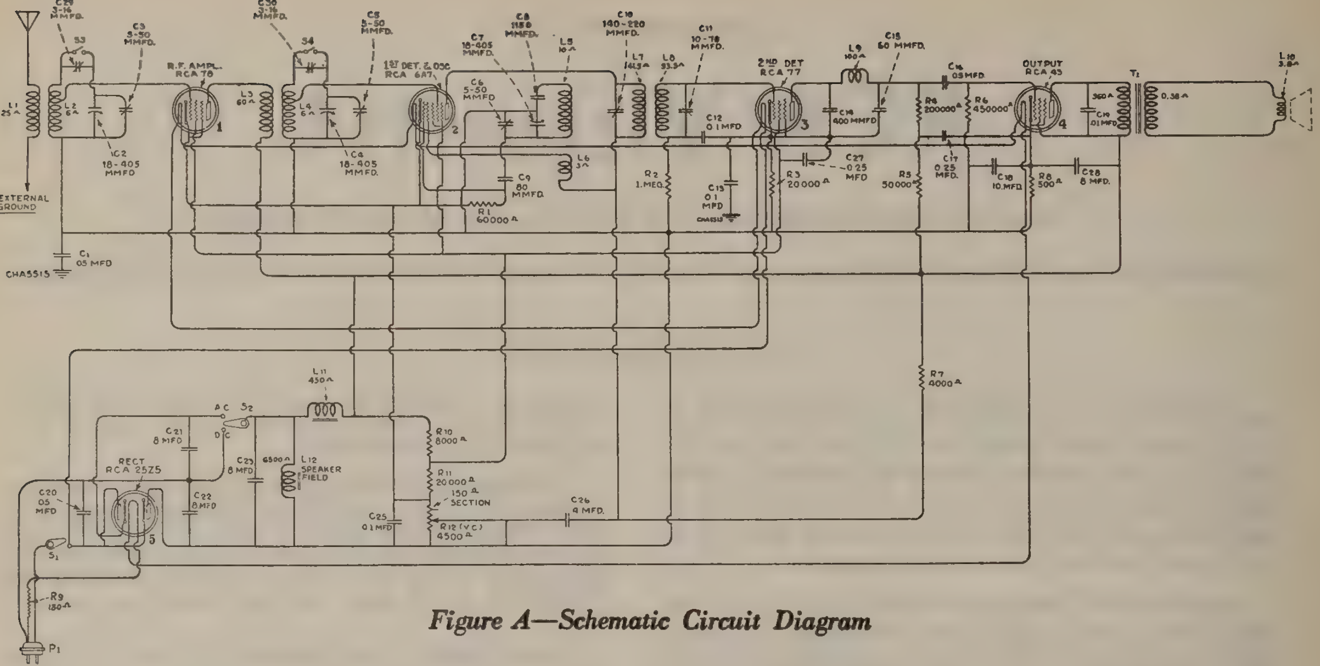


Figure A—Schematic Circuit Diagram

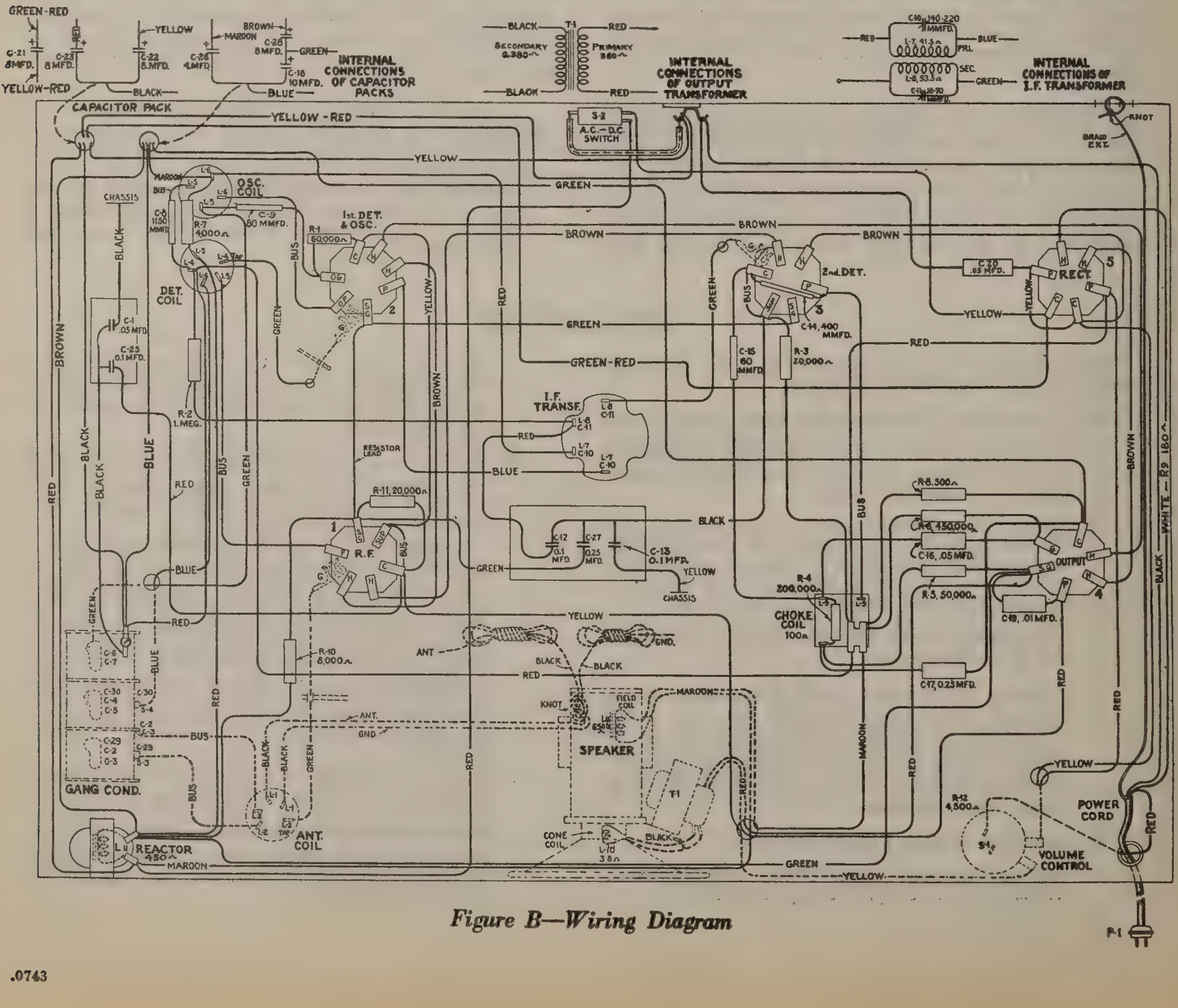


Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating....................100–125 A. C. or D. C.
Frequency Rating (A. C.)..................25–133 Cycles
Power Consumption: {A. C. 60 Cycles, 115 Volts—60 Watts
D. C. 115 Volts—40 Watts
Number and Types of Radiotrons..............1 RCA-78, 1 RCA-6A7, 1 RCA-77, 1 RCA-43, 1 RCA-25Z5—Total, 5

Undistorted Output (A. C.)....................1.5 Watts
Undistorted Output (D. C.)....................0.5 Watt
Frequency Range......540–1710 K. C. and 2400–2500 K. C.

This receiver is a five-tube Superheterodyne designed to operate on A. C. or D. C. over a wide voltage and frequency range. Features such as compact construction, dynamic speaker, single Pentode Output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are included in this instrument.

The circuit consists of an R. F. stage using Radiotron RCA-78, a combined oscillator and first detector using Radiotron 6A7, an I. F. transformer using two tuned circuits, a second detector using Radiotron RCA-77 and a power stage using Radiotron RCA-43. The rectifier is Radiotron RCA-25Z5, which is used in a voltage doubling circuit. This results in considerable more output when the receiver is used on A. C. than that obtained from D. C. operation.

Line-Up Capacitor Adjustments

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator such as Stock No. 9050, giving a signal at 175 K. C., 1400 K. C., 1710 K. C. and 2440 K. C. An output meter and non-metallic screw driver (Stock No. 7065) are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F., line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1710 K. C. This is done with the Range Switch at the broadcast position (counter-clockwise). A similar manner is used as that of the I. F. except that the oscillator is set at 1710 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 8 (minimum dial position). The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) After making the 1710 K. C. adjustment, set the dial at 18 and the oscillator at 1400. Then adjust the first detector and R. F. line-up capacitors only. This adjustment is made so that the R. F. and 1st detector will be aligned over the broadcast band, but the receiver will still tune to 1710 K. C. due to the oscillator line-up capacitor not being readjusted.

(e) Then set the Range Switch at its clockwise position. The oscillator should now be set at 2440 K. C. and the signal tuned in. Two points on the dial will be noted where the signal is heard, one of which may be louder than the other. Set the dial at either point. Note—the 2440 K. C. signal will still be heard at two points, since the R. F. stage acts as a fixed tuned circuit. Adjust the two high-frequency trimmers, located on the lower side of the gang capacitor, until maximum output is obtained.

RADIOTRON SOCKET VOLTAGES

115 Volts D. C. or 60 Cycles A. C.

Divide all A. C. Values (Except Heater) by 1.3 for 25 Cycles

Radiotron No.	Cathode to Control Grid, Volts D. C.		Cathode to Screen Grid, Volts D. C.		Cathode to Plate, Volts D. C.		Plate Current, M. A.		Heater Volts
	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	A. C.	D. C.	
RCA-78 R. F.	2.6	1.5	90	50	157	88.5	5.5	3.0	6.0
RCA-6A7 Oscillator	—	—	—	—	157	88.5	1.7	1.0	6.0
1st Detector	2.6	1.5	90	50	157	88.5	2.5	1.5	—
RCA-77 2nd Detector	Plate and Bias Supply 160 Volts						—	—	6.0
RCA-43 Power	21.0	12.0	135	80	125	72.0	35.0	20.0	25.0
RCA-25Z5 Rectifier	115 R. M. S.						89.0 Total	35.0 Total	25.0

Voltage Across Loudspeaker Field (115 Volts, 60 Cycles—185
115 Volts, 25 Cycles—140
115 Volts, D. C.—105)

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2963	Resistor — 8,000 ohms — Carbon type — 1 watt (R10)—Package of 5	1.10
3033	Resistor — 1 megohm — Carbon type — ¼ watt (R2)—Package of 5	1.00
3572	Socket—7-contact Radiotron socket	.38
3584	Ring—Antenna coil shield retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R1)—Package of 5	1.00
3623	Shield—Antenna, R. F. or oscillator coil shield	.30
3632	Resistor—500 ohms—Carbon type—1 watt —Package of 5	1.10
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3682	Shield—Radiotron shield body	.22
3684	Switch—Toggle type—AC–DC operation (S2)	.94
3685	Coil—Choke coil—Second detector plate (L9)	.54
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3700	Resistor—450,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3701	Capacitor—0.01 mfd. (C19)	.30
3710	Capacitor—60 mmfd. (C15)	.36
3711	Capacitor—80 mmfd. (C9)	.40
3712	Capacitor—400 mmfd. (C14)	.40
3713	Capacitor—0.05 mfd. (C20)	.32
3752	Shaft—Range switch shaft	.50
3753	Contact—Ranges witch contact—Pkg. of 2	.40
3754	Capacitor—1,150 mmfd. (C8)	.50
3755	Capacitor—Comprising two .1 mfd. and one .25 mfd. capacitors (C12, C13, C27)	.60
3901	Capacitor—.05 mfd. (C16)	$0.36
3917	Capacitor—.25 mfd. (C17)	.40
4014	Cord—Power cord—180 ohms (R9)	1.15
4015	Knob—Station selector or volume control knob	.85
4016	Foot—Cabinet foot—Package of 4	.22
6114	Resistor — 20,000 ohms — Carbon type — 1 watt (R11)—Package of 5	1.10
6228	Resistor—200,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
6250	Resistor — 4,000 ohms — Carbon type — ½ watt (R7)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ Watt (R3)—Package of 5	1.00
6464	Transformer—Intermediate frequency transformer (L7, L8, C10, C11)	1.88
6505	Reactor—Filter reactor	1.06
6506	Condenser—Three-gang variable condenser assembly (C2, C3, C4, C5, C6, C7)	3.24
6508	Volume control—Complete with mounting nut (R12, S1)	1.36
6519	Coil—Antenna coil (L1, L2)	.88
6520	Coil—R. F. coil assembly (L3, L4)	.94
6521	Coil—Oscillator coil assembly (L5, L6)	.60
6621	Capacitor—Comprising one .05 and one .1 mfd. capacitors (C1, C25)	.46
6783	Capacitor—Comprising four 8. mfd., one 4. mfd. and one 10. mfd. capacitors (C18, C21, C22, C23, C26, C28)	4.38
7485	Socket—6-contact Radiotron socket	.40
	REPRODUCER ASSEMBLIES	
6509	Transformer—Output transformer (T1)	1.34
7606	Coil assembly—Comprising field coil, magnet and cone support (L12)	2.06
8987	Cone—Reproducer cone complete with voice coil (L10)—Package of 5	5.00
9462	Reproducer complete	5.14

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PL 84

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23718

Printed in U. S. A.

Instructions for

RCA Victor 120

Six-Tube Double-Range Superheterodyne

INSTALLATION

Preliminary—After unpacking the instrument, refer to the tube location diagram on rear of receiver, and ***make certain:***

(a) That all tubes are in the proper sockets and pressed down firmly.

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the 2B7 Radiotron *only*, the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects and run neither close nor parallel to electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length will be found satisfactory. An outdoor antenna of greater length, however, should improve reception and is recommended for use in localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label attached to the rear of the receiver.

OPERATION

The instrument has four operating controls, located on the front panel of the cabinet, as follows:

(1) *Volume Control* (Left-hand Knob)—Volume increases with clockwise rotation.

(2) *Power Switch and Tone Control* (Middle Knob)—In extreme counter-clockwise position, power is "off"—slight clockwise rotation turns on the power. Extreme clockwise position gives full range reproduction—counter-clockwise rotation decreases high frequency (treble) response and reduces static interference.

(3) *Station Selector* (Right-hand Knob—Symmetrical with Volume Control)—Equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) *Frequency Range Switch* (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400–2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:

(a) **Police Calls**—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118–122" for stations operating in the 2450 kilocycle band.

(b) **Amateur Radio "Phone"**—At dial settings "90–95" (assigned band 1900–2000 kilocycles).

(c) **Aviation Reports, Airport Beacons, Etc.**—At dial settings "95–118" (assigned band 2000–2400 kilocycles).

(d) **Amateur Radio "CW" (Code)**—At dial settings "80–90" (assigned band 1715–1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (4).

2. Apply power by turning the Tone Control knob clockwise from the "off" position; continue rotation of this control to the opposite extremity for full-range reproduction. Set the Volume Control near the middle of its range.

3. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard. If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

NOTE—The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Local or strong stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

5. Adjust the Volume Control to the desired volume level.

NOTE—The *automatic volume control* maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

6. Turn the Tone Control counter-clockwise if reduced treble response is preferred, or if interference (static) is excessive.

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

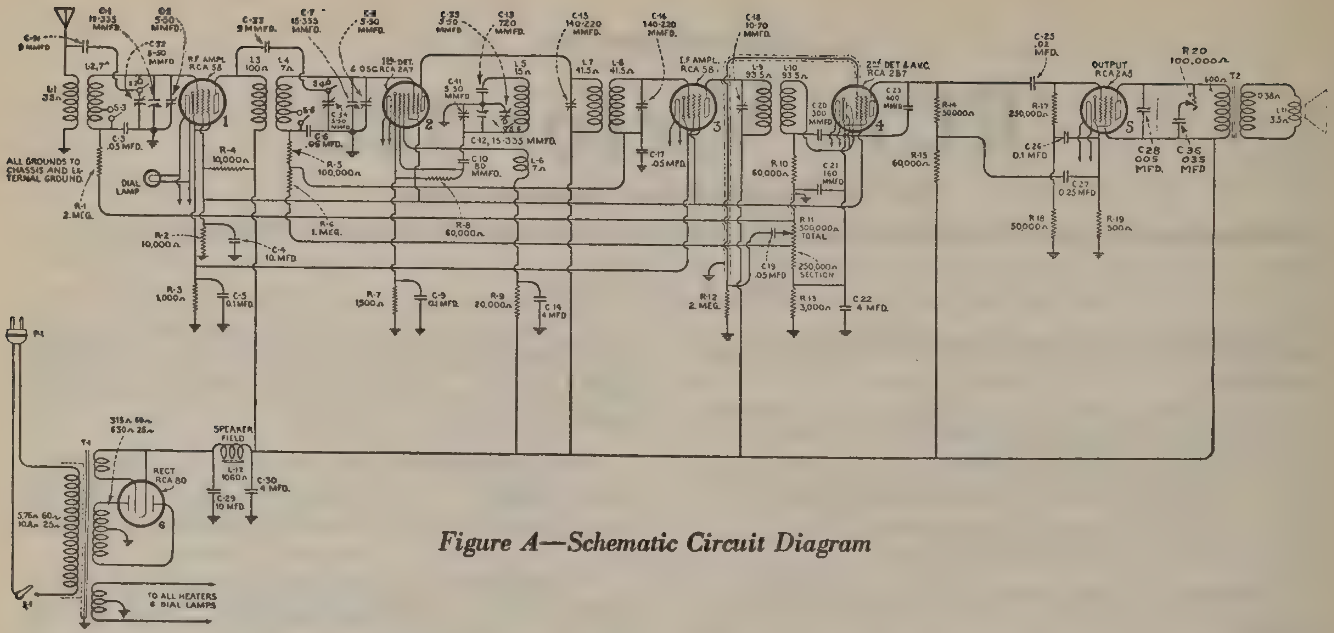

Figure A—Schematic Circuit Diagram

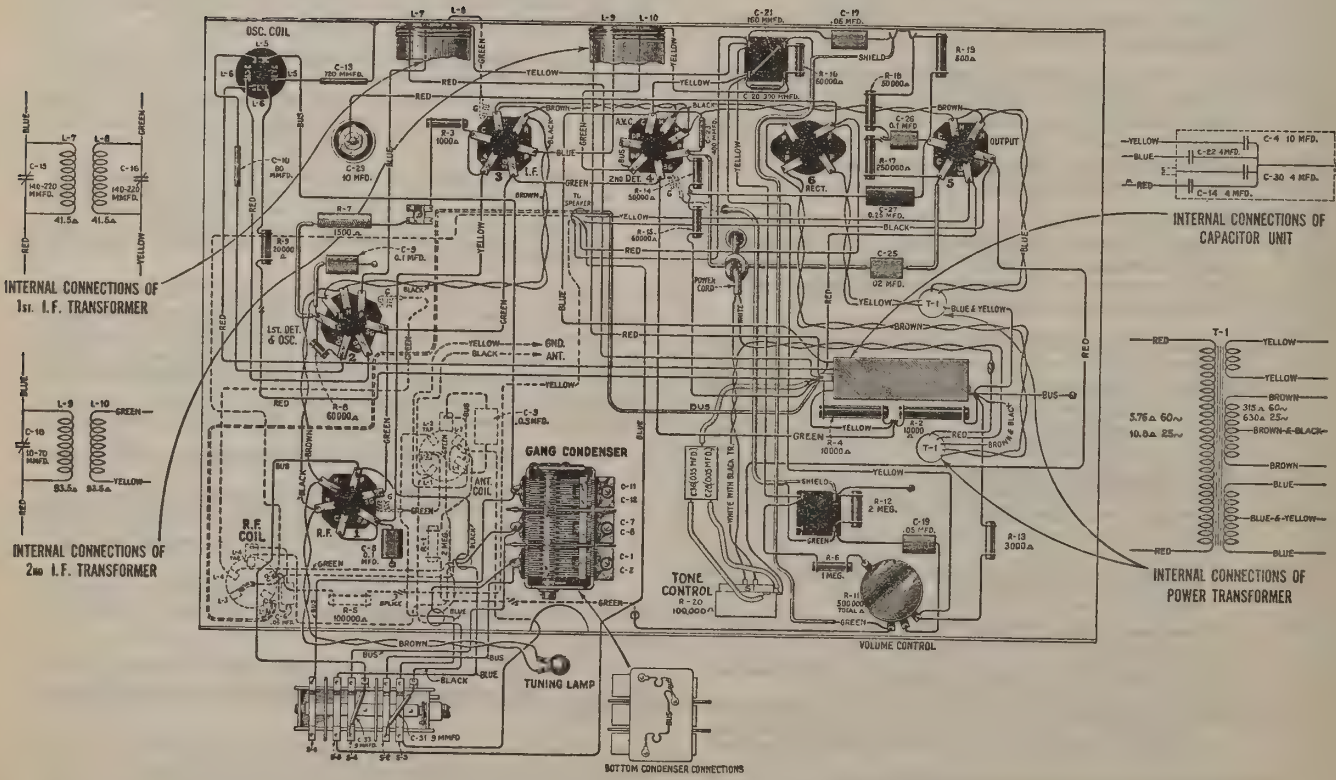
OSC. COIL
INTERNAL CONNECTIONS OF 1st. I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 2nd I.F. TRANSFORMER
INTERNAL CONNECTIONS OF CAPACITOR UNIT
INTERNAL CONNECTIONS OF POWER TRANSFORMER
GANG CONDENSER
R.F. COIL
ANT. COIL
1ST. DET. & OSC.
2ND DET.
I.F.
OUTPUT
RECT.
TONE CONTROL
VOLUME CONTROL
TUNING LAMP
BOTTOM CONDENSER CONNECTIONS
POWER CORD
GND.
ANT.

Figure B—Wiring Diagram

SERVICE DATA

ELECTRICAL SPECIFICATIONS

Voltage Rating............................105–125 Volts
Frequency Rating..................25–60 and 50–60 Cycles
Power Consumption...60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons...............2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output...........................1.75 Watts
Frequency Range..................540 K. C. to 1500 K. C.
and 1400 to 2800 K. C.

This receiver is a six-tube Superheterodyne incorporating features such as Dynamic Loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

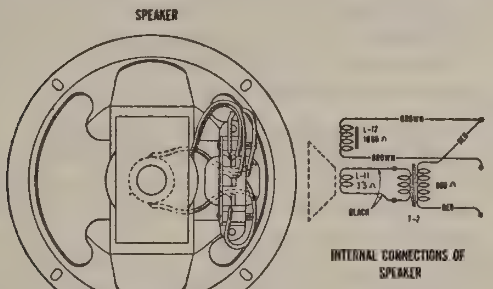

Figure C—Loudspeaker Wiring

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

LINE-UP ADJUSTMENTS

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

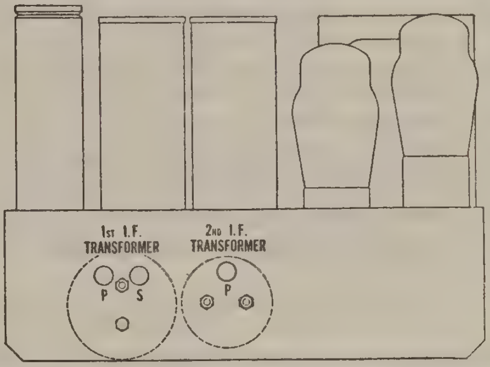

Figure D—Location of I. F. Line-up Adjustment Screws

R. F. and Oscillator Adjustments—The three gang capacitor screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be opposite the last division of the low frequency end of scale with the indicator at its center position. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important points to remember are that the receiver volume control must be at its maximum position and that the input signal from the external oscillator must be no greater than necessary.

TUBE SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	4.0	95	255	5.0	2.31
2. RCA-2A7 1st Det. Osc.	5.0*	95*	255*	3.0*	2.31
3. RCA-58 I. F.	4.0	95	255	5.0	2.31
4. RCA-2B7 2nd Det. A. V. C.	7.5	92	60	2.0	2.31
5. RCA-2A5 Power	20.0	250	235	33.0	2.81
6. RCA-80 Rectifier	700–350 Volts—75 M. A. Total Current				4.82

*The voltages and current refer to the detector part of the tube. The total cathode current is 10 M. A.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.—(C13)	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor — 1500 ohms — Carbon type — ½ watt—(R7)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt—(R6)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—(R5)—Package of 5	1.00
3358	Resistor — 3,000 ohms — Carbon type — ½ watt—(R13)—Package of 5	1.00
3459	Capacitor—80 mmfd.—(C10)	.44
3514	Resistor—250,000 ohms—Carbon type—½ watt—(R17)—Package of 5	1.00
3572	Socket—Radiotron 7 contact socket	.38
3584	Ring—R. F. or oscillator coil retaining ring—Package of 5	.40
3594	Resistor—50,000 ohms—Carbon type—½ watt—(R14, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd.—(C27)	.40
3598	Capacitor—0.1 mfd.—R. F. and I. F. by-pass —(C5)	.36
3615	Knob—Tone control or range switch knob—Package of 5	.60
3616	Capacitor—300 mmfd.—(C20)	.34
3622	Shield—Radiotron shield—2nd detector	.36
3623	Shield—Antenna or R. F. coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3626	Shield—Oscillator coil shield	.22
3627	Knob—Station selector or volume control knob—Package of 5	.75
3630	Resistor — 10,000 ohms — Carbon type — 3 watt—(R2, R4)	.25
3632	Resistor — 500 ohms — Carbon type—1 watt—(R19)—Package of 5	1.10
3633	Capacitor—400 mmfd.—(C23)	.38
3634	Capacitor—160 mmfd.—(C21)	.34
3639	Capacitor—0.02 mfd.—(C25)	.25
3640	Capacitor—0.05 mfd.—(C3, C6, C17, C19)	.25
3641	Capacitor—0.1 mfd.—(C9, C26)	.35
3642	Capacitor—0.008 mfd.—(C24)	.25
3682	Shield—Radiotron shield—1st detector	.22
3721	Resistor — 1,000 ohms — Carbon type — ½ watt—(R3)—Package of 5	1.00
3783	Capacitor—9 mmfd.—(C31, C33)—Package of 2	$0.50
3789	Shield—Radiotron shield—I. F. or R. F.	.25
3881	Escutcheon—Station selector escutcheon	.42
3882	Escutcheon—Volume control escutcheon	.42
6188	Resistor — 2 megohm — Carbon type — ½ watt—(R1, R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—(R8, R10, R15)—Package of 5	1.00
6300	Socket—Radiotron 4 contact socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—(R9)—Package of 5	1.00
6471	Coil—Oscillator coil—(L5, L6)	.74
6483	Transformer—1st intermediate frequency transformer—(L7, L8, C15, C16)	1.84
6484	Transformer—2nd intermediate frequency transformer—(L9, L10, C18)	1.70
6485	Volume control—With mounting nut—(R11)	1.20
6487	Capacitor assembly—Comprising three 4.0 mfd. and one 10.0 mfd. capacitors—(C4, C14, C22, C30)	2.90
6527	Coil—Antenna coil—(L1, L2)	1.08
6528	Coil—R. F. coil—(L3, L4)	.94
6534	Switch—Range switch	1.25
6598	Condenser—3 gang variable tuning condenser	3.00
6619	Tone control with mounting nut—(R20)	1.44
6620	Capacitor—Comprising one .005 and one .035 mfd.—(C28, C36)	.50
6622	Scale—Dial scale and drive assembly	.95
7485	Socket—Radiotron 6 contact socket	.40
7590	Capacitor—10.0 mfd.—(C29)	1.40
9005	Transformer—Power transformer—105–125 volts, 50–60 cycles—(T1)	4.80
9006	Transformer—Power transformer—200–250 volts, 50–60 cycles	5.05
9024	Transformer—Power transformer—105–125 volts, 25–40 cycles	5.85
	REPRODUCER ASSEMBLIES	
6476	Transformer—Output transformer—(T2)	1.44
9032	Coil assembly—Comprising coil, magnet and cone support—(L12)	2.35
9428	Cone — Reproducer cone — (L11) — Package of 5	5.00
9440	Reproducer complete	4.75

RCA Victor Company, Inc.

CAMDEN, NEW JERSEY, U. S. A.

23566

Printed in U. S. A.

Instructions for

RCA Victor Models 121 and 122

Six-Tube "Selective Short-Wave" Superheterodyne Receivers

INTRODUCTION

This radio receiver may be operated in either of two tuning ranges, one covering the usual band of from 540 to 1500 kilocycles and the other covering a band of from 5400 to 15,350 kilocycles. Between the limits of the latter range are included four of the internationally-assigned short-wave broadcast bands, located at 49, 31, 25 and 19 meters, respectively. Thus, in addition to providing entertainment from the accustomed broadcasting stations, this instrument permits direct reception of programs from the principal short-wave broadcast transmitters located in all parts of the world.

Short-wave facilities in this instrument are built-in as integral parts of the radio chassis—not simply connected to an existing chassis as a short-wave adaptor — resulting in distinctly superior performance. Both tuning ranges are quickly interchangeable by means of a push-pull switch on the front of the cabinet. Other features contributing to tuning ease and accuracy are: (1) the "vernier" dual-ratio station selector drive, permitting either rapid or fine adjustments independently; and (2) the clock-type "full-vision" illuminated dial, calibrated directly in frequency for both ranges.

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Chassis—Proper operation of the instrument can be assured only when the radio chassis rests lightly as intended upon its rubber support cushions. To prevent damage in shipment, the chassis is clamped rigidly to the cabinet; the support cushions are thus placed under compression and rendered ineffective. At installation, therefore, loosen the four clamping screws (accessible beneath the cabinet) just sufficiently to permit free cushioning of the chassis.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in their sockets. Before making the required external connections, however, it will be advisable to examine the tube installation as one or more of the tubes, shields or dome terminal clips may have been jarred loose in shipment. Refer to the tube location diagram printed on the rating label inside the cabinet and *make certain:*

(1) That all tubes are in the proper sockets and pressed down firmly.

(2) That all shields are rigidly in place over the tubes represented by double circles on the diagram.

(3) That the spring connectors of the short flexible (grid) leads, shown on the diagram, are securely attached to the dome terminals of the proper tubes.

NOTE—The grid lead for the RCA-2B7 must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Antenna and Ground—The efficiency of any antenna varies greatly with the frequency of incoming radio waves, a given length being excellent at certain frequencies and comparatively poor at others. For uniform results throughout a wide tuning range such as found in this instrument, therefore, an antenna of adjustable length would be desirable theoretically. From a practical standpoint, however, very good results will be obtained using two antennas of different length, one 24–29 feet for short-wave reception and the other 50–100 feet for reception in the standard broadcast band (540–1500 kc.), the lead-in considered as part of the total length in each case.

The shorter antenna may be used alone if preferred, but probably will not be satisfactory for receiving distant or low-power stations in the standard broadcast band. Further, no advantage will be gained by its use on the shorter wave-lengths unless it can be installed so that the majority of its length is unshielded (not contained in a building of metallic construction) and sufficiently remote from sources of man-made interference (such as house-wiring, power lines, street-railways and passing automobiles) to prevent excessive noise. If these conditions cannot be fulfilled, it will be preferable to erect a single antenna of compromise length (100–105 feet overall) which, in addition to providing excellent results in the standard broadcast band, will also favor reception in the short-wave broadcast bands located at 49, 31, 25 and 19 meters.

Good reception in many installations will be obtained without connecting the instrument to an external ground since the power line characteristics often render a separate radio ground unnecessary. In any case, however, best results will be insured by grounding the set in the conventional manner to a water-pipe or radiator or to a metallic pipe or stake driven from five to eight feet into the soil. The ground lead when used should be short, preferably not more than 15 feet in length, and connected to a clean portion of the pipe or stake surface by means of an approved ground clamp.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord of the instrument to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label. While any voltage within the specified limits may be employed, a change in the internal connections will be required if the local voltage is less than 110 (for 100–125 volt models) or 220 (for 200–250 volt models). The alternative connections are shown in the Service Data section of this booklet and the changeover, when necessary, preferably should be made by the dealer. Consult your power company if you are in doubt as to the specific voltage or frequency of the supply.

OPERATION

Controls—The four control knobs on the front of the cabinet, in sequence from left to right, are:

(1) ***Power Switch and Tone Control***—The power switch operates at the counter-clockwise end of the control range. A slight clockwise rotation actuates the switch, causing illumination of the dial—indicative of normal operation. Continued clockwise rotation increases the treble response gradually.

(2) ***Volume Control***—Sound level (volume) increases upon rotation of this control in a clockwise direction.

(3) ***Station Selector*** (Dual Knob)—The large knob (adjacent to panel) should be used for rapid approximate settings of the dial pointer and the small outer knob for accurate or "vernier" adjustments. The lower end of the pointer traverses a calibrated scale which is applicable to either tuning range (*to obtain kilocycles from scale markings, add one cipher for standard broadcast band and two ciphers for short-wave range*). Selection of any available short-wave broadcast band is facilitated by alignment of the opposite end of the pointer with the proper bracketed segment on the upper half of the dial. These segments indicate the approximate extremities of each band and are identified with respect to nominal wavelength: 49, 31, 25 and 19 (meters).

(4) ***Range Switch***—This switch is of push-pull construction and adapts the receiver for operation within either tuning range as follows:

  (a) *Inward Position*—For standard broadcast band (540 to 1500 kilocycles).

  (b) *Outward Position*—For short-wave range (5400 to 15,350 kilocycles).

Procedure—The actual operation is simple and not unlike that of more conventional instruments designed for the reception of standard broadcast programs alone. However, the full possibilities of any short-wave receiver cannot be attained unless the user has a practical knowledge of short-wave transmission behavior and operating schedules. It is therefore recommended that the appended Notes on Short-Wave Reception and the inserted Short-Wave Broadcasting Station List and Program Schedule be studied carefully.

A brief outline of the recommended operating procedure should suffice:

1. Set the Range Switch for the frequency range within which the desired station is included.

2. Turn the Power Switch "on" and adjust the Tone Control to its extreme clockwise position—*for full-range reproduction*. Wait a few seconds in order that the tubes may attain the proper temperature before attempting further operation.

3. Advance the Volume Control to a position near the middle of its range and rotate the Station Selector until the dial indicator assumes a position coincident with the listed frequency of the desired station. Then with the vernier control (small knob), turn the selector *very slowly* over a narrow range on each side of that setting, advancing the Volume Control further in a clockwise direction and repeating the tuning process, if necessary, until the signal is heard.

NOTE—This procedure is important—especially so for short-wave reception. Because of the wide band of frequencies covered by the short-wave range, tuning is critical (sharp). A signal of suitable strength often will be imperceptible if passed through rapidly or in a haphazard manner.

4. After receiving the signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Then readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. *This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.*

5. Adjust the Volume Control to the desired volume level.

NOTE—The automatic volume control built into this instrument maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

6. Turn the Tone Control counter-clockwise if decreased treble response is preferred or to reduce noise interference if excessive.

7. When through operating, return the Tone Control to its counter-clockwise extremity, thus switching "off" the power.

NOTES ON SHORT-WAVE RECEPTION

While the design of this instrument is such that no previous experience or special skill is required for proper operation, its full possibilities can be realized only by those familiar with the general characteristics of transmission on the shorter wave-lengths. The following notes are a summary of extensive data compiled mainly by experimentation and should be found both interesting and helpful, especially to beginners in the field of short-wave reception.

Broadcast transmission at 49 meters is most reliable when received from a distance of 300 miles (500 kilometers) or more, although good reception at distances greater than 1500 miles (2400 kilometers) can be expected only when a large portion of the signal path lies in darkness.

Thirty-one (31) meter stations afford greatest reliability of service to receivers situated at a distance exceeding 800 miles (1300 kilometers). Good reception from distant stations in this band is possible both day and night.

Reception from stations operating in the 25 meter band is most common when a span of 1000 miles (1600 kilometers) or more separates the receiver and transmitter. Such transmission over distances of less than 2000 miles (3200 kilometers), will be received best during daylight hours. The more distant stations, however, can still be heard well after nightfall under favorable conditions.

In the 19 meter band, stations situated at a distance of 1500 miles (2400 kilometers) or greater will be found most satisfactory. Signals in this band will generally be heard during daylight hours—rarely after nightfall or when any appreciable portion of the transmission path is in darkness. Wave-lengths below 19 meters are useful only when transmitted entirely through daylight and over long distances (2000 miles or more); ordinarily they cannot be received after sunset.

Transmitted signals of any wave-length are known to divide into two components—the "ground" wave and the "sky" wave. The former remains close to the earth's surface, providing reliable service only over short distances from the broadcasting station. The sky wave, however, travels into the higher layers of the atmosphere and is reflected back to the earth's surface at an appreciable distance from the station. With short-wave signals, the sky wave usually does not return within the radius covered by the ground wave, resulting in a so-called dead-spot region within which reception is impossible or extremely unsatisfactory. The length of the region wherein such conditions are effective is known as the skip distance, varying greatly from day to night and from summer to winter approximately as shown in Table I.

When attempting to receive distant or foreign stations, the time standards observed at various longitudes throughout the world must be considered. At 8:00 P. M. in New York or 7:00 P. M. in Chicago, it is of the next day—1:00 A. M. in London, 2:00 A. M. in most of Europe and 11:00 A. M. in Australia. On the American continents, therefore, regular evening broadcasts from Europe will be received in the late afternoon and from Australia in the early morning. Special programs, however, are frequently transmitted from European stations at times chosen for evening reception in America.

Although reception on the short wave-lengths is less affected by atmospherics or static and good results may be had in midsummer even during a thunder storm, the reverse is true of man-made interference. Electrical machinery such as trolleys, dial telephones, motors, electric fans, automobiles, airplanes, electrical appliances, flashing signs and oil burners create far more interference to the shorter waves than to frequencies in the standard broadcast band (200 to 555 meters).

While the foregoing statements are valid, many other factors may so influence the transmission of short waves that exceptions are probable in certain locations. Experience in the operation of short-wave receivers in a given location is the best guide as to what to expect in reception at various times.

Any person interested primarily in short-wave reception will find membership in the International Short-Wave Club of great value. The club is a non-commercial organization and issues a monthly magazine (International Short-Wave Radio) which contains up-to-date information pertaining to short-wave broadcasting, amateur activities and commercial, police and aircraft services. The annual membership fee, including the magazine subscription, is one dollar ($1.00), U. S. Currency; single copies of the periodical may be procured by non-members for ten cents ($0.10) U. S. Currency, each. Address International Short-Wave Club, P. O. Box 713, Klondyke, Ohio, U. S. A.

Table 1—Effect of Time of Day and Season of Year on Short-Wave Transmission*

Wave-length (Meters)	Ground Wave Range		Sky Wave (Mid-Summer) Approximate Range				Sky Wave (Mid-Winter) Approximate Range			
			Noon		Midnight		Noon		Midnight	
	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.
100	90	145	—90	—145	90—600	145—960	90—100	145—160	90—2500	145—4000
49	75	120	100—200	160—320	250—5000	400—8000	200—600	320—960	400—∞	640—∞
31	60	97	200—700	320—1125	1000—∞	1600—∞	500—2000	800—3200	1500—∞	2400—∞
25	50	80	300—1000	480—1600	1500—∞	2400—∞	600—3000	960—4800	2000—∞	3200—∞
19	35	56	400—2000	640—3200	2500—∞	4000—∞	900—4000	1450—6400	X	X
15	15	24	700—4000	1125—6400	X	X	1500—∞	2400—∞	X	X

∞—Unlimited distance.

X—Ordinarily cannot be heard.

* Time and season apply to transmitting station. Distances specified are based on relatively high-power transmission and favorable conditions of reception.

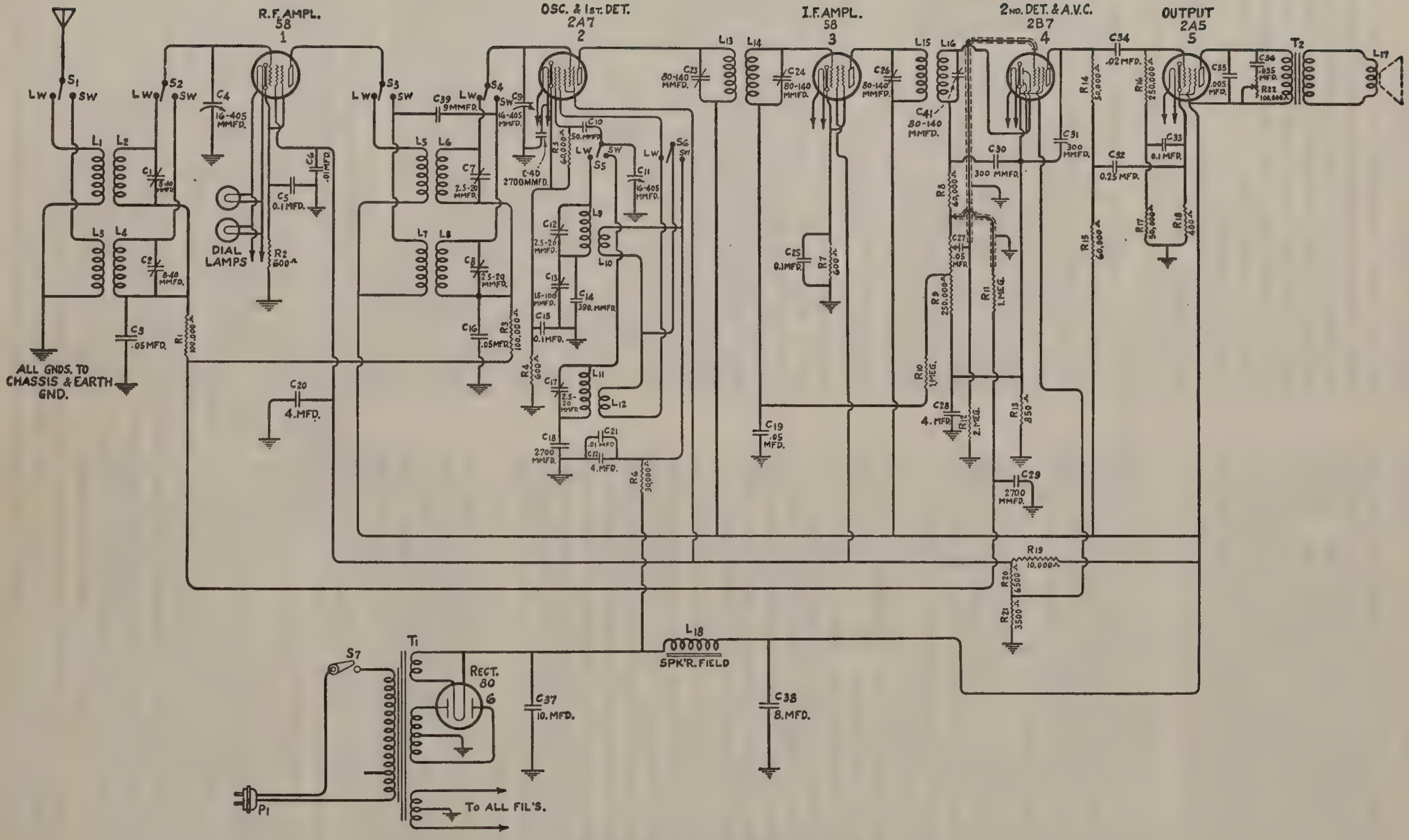

Figure A—Schematic Circuit

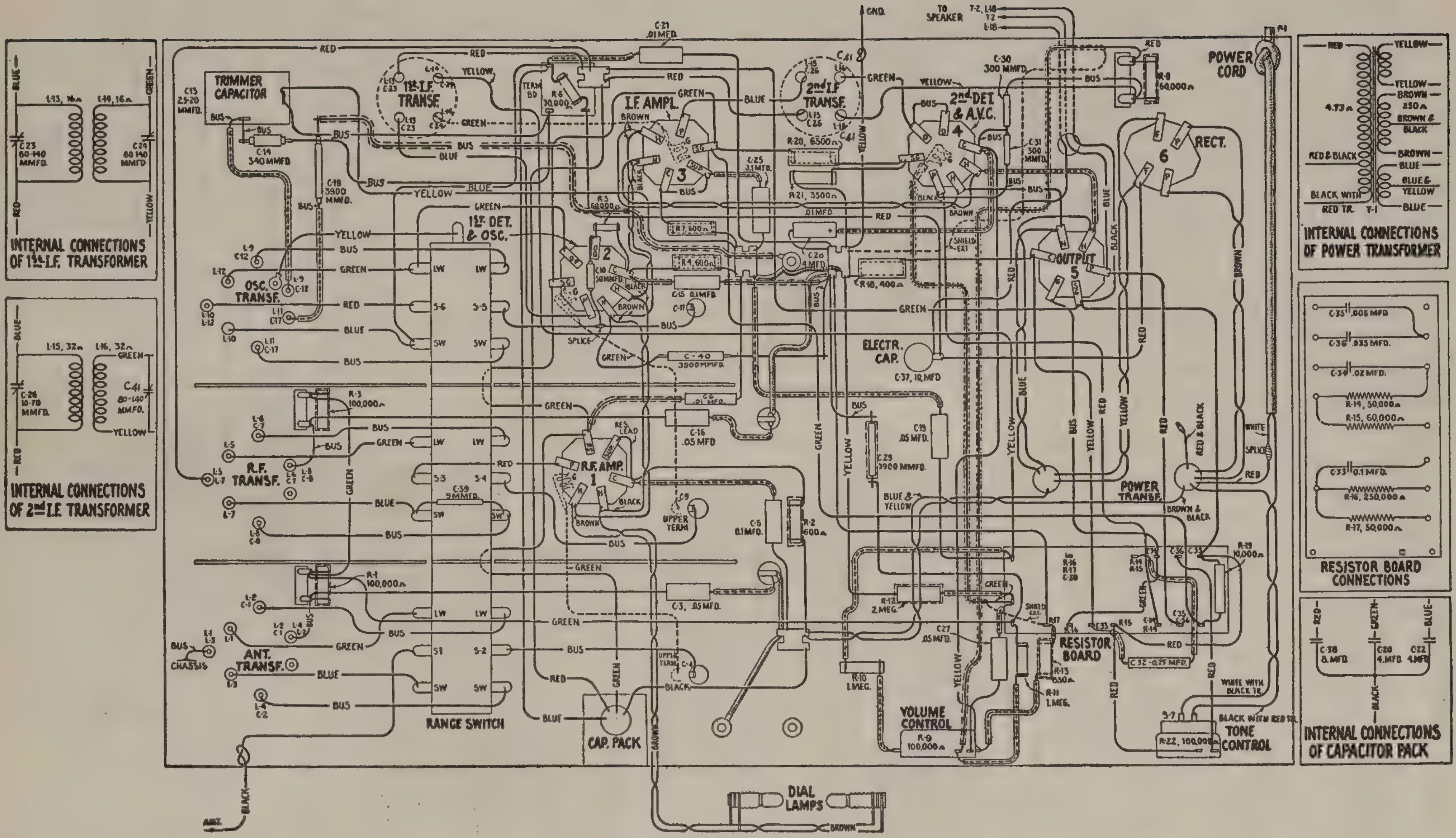
POWER CORD
RECT. 6
OUTPUT 5
2nd DET. & A.V.C. 4
2nd I.F. TRANSF.
I.F. AMPL. 3
1st I.F. TRANSF.
TRIMMER CAPACITOR
1st DET. & OSC. 2
OSC. TRANSF.
R.F. AMP. 1
R.F. TRANSF.
ANT. TRANSF.
RANGE SWITCH
CAP. PACK
DIAL LAMPS
VOLUME CONTROL R-9 100,000 Ω
TONE CONTROL R-22, 100,000 Ω
RESISTOR BOARD
POWER TRANSF.
ELECTR. CAP. C-37, 10 MFD
TO SPEAKER
GND.
ANT.
BUS CHASSIS
INTERNAL CONNECTIONS OF 1st I.F. TRANSFORMER
INTERNAL CONNECTIONS OF 2nd I.F. TRANSFORMER
INTERNAL CONNECTIONS OF POWER TRANSFORMER
RESISTOR BOARD CONNECTIONS
INTERNAL CONNECTIONS OF CAPACITOR PACK

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating .... 100–125 Volts
Frequency Rating .... 25–60 and 50–60 Cycle
Power Consumption .... 60 Cycle, 75 Watts; 25 Cycle, 80 Watts
Number and Type of Radiotrons 2 RCA-58,
1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Tuning Ranges ...... 540 K. C.–1500 K. C.—5400 K. C.–15,350 K. C.
Undistorted Output .... 1.75 Watts

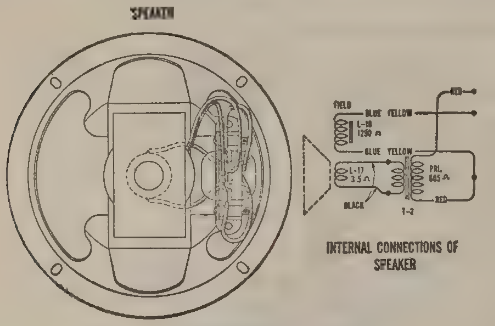

Figure C—Loudspeaker Wiring

This receiver is a six tube two band A. C. operated Superheterodyne Receiver combining the standard and short-wave broadcasting bands. The frequency ranges are selected by means of a two position switch. Other features include a double reduction vernier drive using two concentric knobs giving a 10–1 and a 55–1 ratio of speed reduction, a continuously variable tone control, six-inch electrodynamic loudspeaker, automatic volume control, single Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

The chassis is of compact constuction, affording unusual accessibility to all parts and adjustments. An "Airplane" type dial calibrated in frequency and showing the location of the short-wave bands is a special feature of this instrument. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the loudspeaker wiring.

Line-Up Capacitor Adjustments

In order to properly align this receiver, it is essential that Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a non-metallic screwdriver such as Stock No. 7065 and an output meter are required. The output meter should be preferably a thermo-couple galvanometer connected across or in place of the cone coil of the loudspeaker.

I. F. Tuning Adjustments—Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 370 K. C. and the adjustment screws are accessible as shown in Figure D. Proceed as follows:

(a) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(c) Adjust the secondary and primary of the first and then the second I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The R. F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K. C. series capacitor, which is accessible from the rear of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground leads of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 54. Then set the Test Oscillator at 1400 K. C., the dial indicator at 140 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

(b) With the Range Switch at the "in" position, adjust the three trimmers under the three R. F. coils, designated as L. W. in Figure D, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K. C. The trimmer capacitor, accessible from the rear of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1400 K. C. adjustment.

(c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 15,000 K. C. and set the dial at 150. Adjust the three trimmer capacitors designated as SW in Figure D for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator while the position that uses a higher capacitance is correct for the detector. *Both of these adjustments must be made as indicated irrespective of output.* The R. F. is merely peaked. In conjunction with the detector adjustment, it is necessary to rock the main tuning capacitor back and forth while making the adjustment. This completes the line-up adjustments.

The important points to remember are the need for using the minimum oscillator output to obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

Power Transformer Connections

The power transformer used in this Model has a tapped primary winding. The transformer is normally connected for lines ranging in voltage from 110 to 125 volts. If for any reason the line is normally below 110 volts, the connections should be changed so the tap will be used. This is done by unsoldering the black with red tracer transformer lead connected to the power switch (on tone control) and substituting the red and black lead normally taped up. The black with red tracer lead should then be carefully taped to prevent short-circuit.

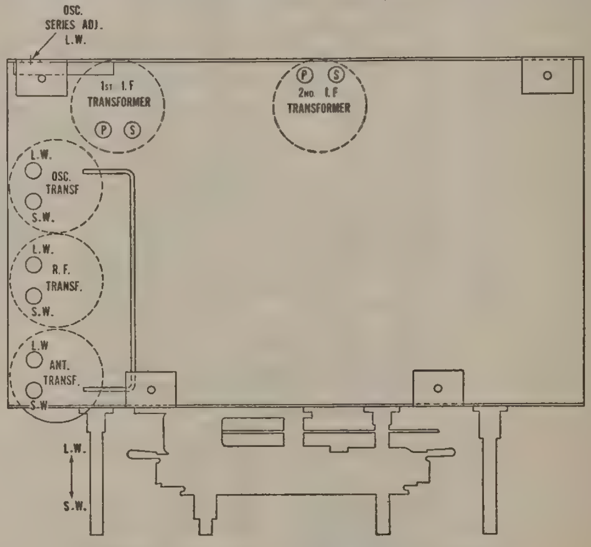

Figure D—Location of Line-Up Capacitors

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.0	100	265	6.0	2.32
2. RCA-2A7 1st Det. Osc.	3.0	100*	265*	2.0*	2.32
3. RCA-58 I. F.	3.0	100	265	6.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	1.5	35	100	1.5	2.32
5. RCA-2A5 Power	16.0	255	240	35.0	2.32
6. RCA-80 Rectifier	725 Volts R. M. S.—75 M. A. Total Current				4.80

*The voltages and current refer to the detector part of the tube.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2240	Resistor — 30,000 ohms — Carbon type — 1 watt (R6)	$0.22
2747	Cap—Contact cap—Package of 5	.50
3056	Shield—2nd detector Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R10, R11)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R1, R3)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3514	Resistor—250,000 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R14, R17)—Package of 5	1.00
3615	Knob—Range switch or tone control knob (Model 121)—Package of 5	.60
3631	Resistor—850 ohms—Carbon type—½ watt (R13)—Package of 5	1.00
3639	Capacitor—.02 mfd. (C34)	.25
3683	Shield—Radiotron shield top	.20
3701	Capacitor—.01 mfd. (C6, C21)	.30
3702	Capacitor—.25 mfd. (C32)	.42
3768	Screw—Square head No. 6–32–¼″ set screw for condenser drive—Package of 10	.35
3796	Capacitor—4. mfd. (C28)	.60
3849	Capacitor—50 mmfd. (C10)	.30
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor (C13)	.78
3877	Capacitor—.1 mfd. (C5, C15, C25, C33)	.32
3878	Screw—No. 4–40–$\frac{3}{16}$″ screw for fastening station selector pointer—Package of 20	.25
3888	Capacitor—.05 mfd. (C19, C27)	.25
3892	Resistor—600 ohms—Carbon type—½ watt (R2, R4, R7)—Package of 5	1.00
3897	Resistor—400 ohms—Carbon type—1 watt (R18)—Package of 5	1.10
3901	Capacitor—.05 mfd. (C3, C16)	.36
3902	Knob — Station selector knob complete (Model 121)	.44
3903	Screw—No. 8–32–$\frac{3}{16}$″ headless cup point set screw for station selector knob—Package of 20	.36
3904	Knob—Volume control knob (Model 121)—Package of 5	.88
3905	Screw—Chassis mounting screw assembly comprising 4 screws, 4 washers, and 4 cushions	.46
3906	Mounting assembly — Variable condenser mounting assembly comprising 3 bushings, 3 lockwashers, 3 nuts, and 3 washers	.28
3937	Capacitor—300 mmfd. (C30, C31)	.34
3938	Capacitor—9 mmfd. (C39)	.25
3939	Resistor — 3,500 ohms — Carbon type — ½ watt (R21)—Package of 5	1.00
3940	Pointer—Station selector pointer—Package of 5	.50
3941	Dial—Station selector dial—Package of 5	1.75
3942	Shield—1st detector Radiotron shield	.18
3943	Screen—Translucent screen for dial light—Package of 2	.18
3944	Shield—Antenna, R. F. or oscillator coil shield	$0.28
3991	Resistor—10,000 ohms—Porcelain type (R19)	.60
4031	Capacitor—2,700 mmfd. (C18, C29)	.50
4032	Capacitor—390 mmfd. (C14)	.34
6188	Resistor—2 megohm—Carbon type—½ watt (R12)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R5, R8, R15)—Package of 5	1.00
6571	Capacitor—10 mfd. (C37)	1.20
6620	Capacitor—Comprising one .005 mfd. and one .035 mfd. (C35, C36)	.50
6676	Socket—6-contact Radiotron socket—Output	.40
6694	Condenser—3-gang variable tuning condenser (C4, C9, C11)	3.75
6695	Volume control (R9)	1.20
6696	Switch—Range switch (S1, S2, S3, S4)	2.24
6697	Transformer—First intermediate frequency transformer (L13, L14, C23, C24)	1.80
6698	Transformer—Second intermediate frequency transformer (L15, L16, C26, C41)	1.78
6699	Coil—R. F. coil (L5, L6, L7, L8, C7, C8)	2.44
6700	Coil—Oscillator coil (L9, L10, L11, L12, C12, C17)	2.30
6701	Coil—Antenna coil (L1, L2, L3, L4, C1, C2)	2.64
6702	Drive—Variable tuning condenser drive assembly complete	1.86
6703	Capacitor pack—Comprising one 8. mfd. and two 4. mfd. capacitors (C20, C22, C38)	2.46
6704	Shaft—Tuning condenser drive assembly shaft	.64
6705	Tone control complete (R22)	1.20
6706	Bezel—Metal bezel for station selector dial glass (Model 121)	.42
6707	Glass—Station selector dial glass	.20
6708	Ring—Retaining ring for dial glass—Package of 5	.44
6752	Knob—Station selector knob (Model 122)—Package of 5	.60
6753	Knob—Volume control knob (Model 122)—Package of 5	.60
6754	Knob—Range switch or tone control knob (Model 122)—Package of 5	.60
6755	Bezel—Metal bezel for station selector dial glass (Model 122)	.50
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—I. F. and R. F. amplifier Radiotron shield	.25
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
9446	Transformer—Power transformer—105–125 volts 50–60 cycles (T1)	5.40
9451	Transformer—Power transformer—105–125 volts 25–40 cycles	5.40
9452	Transformer—Power transformer—200–250 volts 50–60 cycles	5.52
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	REPRODUCER ASSEMBLIES (Models 121 and 122)	
6476	Transformer—Output transformer (T2)	1.44
9428	Cone—Reproducer cone complete (L17)—Package of 5	5.00
9449	Reproducer complete	5.20
9450	Coil—Fieldcoil magnet and cone support (L18)	2.80

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

23598

Printed in U. S. A.
Sig. Q

RCA Victor "All-Wave"

Models 140, 141, 141-E, 240 and AVR-1

Eight-Tube Superheterodyne Receivers

INSTRUCTIONS

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

INTRODUCTION

This "all-wave" radio receiver embodies the widely-recognized superheterodyne circuit and is capable of operation through a continuous tuning range of from 540 to 18,000 kilocycles (555 to 16.7 meters). Certain models intended primarily for European destinations or for special aviation service are operable through an additional range of from 150 to 410 kilocycles (2000 to 732 meters) for long-wave services. All facilities provided in this instrument for reception beyond the limits of the standardized broadcast band (540 to 1500 kilocycles) are built-in as integral parts of the radio chassis—not simply connected to an existing chassis as a short-wave adaptor—resulting in distinctly superior performance.

To facilitate tuning as far as possible, the complete main tuning range is divided into four overlapping steps, each spread over the full span of the dial. These steps, together with the long-wave range provided in some models, are quickly interchangeable by means of a switch located on the front of the cabinet. Other features contributing to tuning ease and accuracy are the clock-type "full-vision" illuminated dial, calibrated throughout in frequency, and the associated vernier (double-reduction ball-bearing) tuning drive.

The technically-informed user of this instrument naturally will be interested in its many advanced engineering features. Of chief importance among these are the use of: (1) tuned-radio-frequency amplification preceding the heterodyne circuit to minimize extraneous signal interference (image-frequency response, etc.) and to improve the "signal-noise" ratio, (2) automatic volume control, and (3) a high-powered (Class B) audio-output system utilizing the new "twin-amplifier" Radiotron RCA-53. In general, all of the best practices observed heretofore in modern, high-grade receivers of the standard broadcast type are incorporated in this "all-wave" instrument, thus insuring excellent performance over the entire tuning range. In view of the necessary complexity of design, the extreme simplicity of operation accomplished is remarkable and represents a noteworthy advancement in the radio art.

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. Before making the required external connections, however, it will be advisable to examine the tube installation as one or more of the tubes, shields or dome terminal clips may have been jarred loose in shipment. Refer to the tube location diagram printed on the rating label inside the cabinet and make *certain:*

(1) That all tubes are in the proper sockets and pressed down firmly.

(2) That all shields are rigidly in place over the tubes represented by double circles on the diagram.

(3) That the spring connectors of the short flexible (grid) leads, shown on the diagram, are securely attached to the dome terminals of the proper tubes.

NOTE—The grid lead for the RCA-2B7 must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Antenna and Ground—The efficiency of any antenna varies greatly with the frequency of incoming radio waves, a given length being excellent at certain frequencies and comparatively poor at others. For uniform results throughout a wide tuning range such as found in this instrument, therefore, an antenna of adjustable length would be desirable theoretically. From a practical standpoint, however, very good results will be obtained using two antennas of different length, one 24–29 feet for short-wave reception and the other 50–100 feet for reception in the long-wave, standard broadcast and police bands, the lead-in considered as part of the total length in each case.

The shorter antenna may be used alone if preferred but probably will not be satisfactory for receiving distant or low-power stations in the standard broadcast band. Further, no advantage will be gained by its use on the shorter wavelengths unless it can be installed so that the majority of its length is unshielded (not contained in a building of metallic construction) and sufficiently remote from sources of man-made interference (such as housewiring, power lines, street-railways and passing automobiles) to prevent excessive noise. If these conditions cannot be fulfilled, it will be preferable to erect a single antenna of compromise length (100–105 feet overall) which, in addition to providing excellent results in the standard broadcast band, will also favor reception in the short-wave broadcast bands located at 49, 31, 25 and 19 meters.

Good reception in many installations will be obtained without connecting the instrument to an external ground since the power line characteristics often render a separate radio ground unnecessary. In any case, however, best results will be insured by grounding the set in the conventional manner to a water-pipe or radiator or to a metallic pipe or stake driven from five to eight feet into the soil. The ground lead when used should be short, preferably not more than 15 feet in length, and connected to a clean portion of the pipe or stake surface by means of an approved ground clamp.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Power Supply—The instruments in this series are supplied in either of two alternating-current power-supply ratings: (1) 100–125/200–250 volts, 50–60 cycles and (2) 100–125 volts, 25–60 cycles (see rating label inside cabinet). To insure correct tube operating voltages, both types are equipped to permit rearrangement of the internal connections to conform with the actual voltage available. Thus, the 50–60 cycle models may be adapted for 100–115, 115–125, 200–230 or 230–250 volts; and the 25–60 cycle models for either 100–115 or 115–125 volts.

Standard models of both types are connected at the factory for correct operation at 115–125 volts; models rated 100–125/200–250 are connected to afford proper operation at 230–250 volts *when so indicated by a tag attached to the power cord.* Hence, if the local voltage (consult your power company if in doubt) is within any of the other possible ranges of the instrument, reconnections as described in the Service Data section of this booklet will be required and preferably should be made by your dealer. ***After making certain that the instrument has been connected for the proper voltage, attach the power cord to the electrical outlet.***

OPERATION

Controls—The four control knobs on the front panel of the cabinet serve the following purposes:

(1) ***Range Switch*** (Left-hand Knob)—This switch converts the receiver for operation within any of the tuning ranges provided. As indicated on the selector dial, the letters on the switch escutcheon signify:

X—*Long-Wave Range*—150 to 410 kilocycles (2000 to 732 meters). This range is included only in certain models of the instrument (see "Introduction")

A—*Standard Broadcast Band*—540 to 1500 kilocycles (555 to 200 meters).

B—*Police Band*—1500 to 3900 kilocycles (200 to 77 meters). Services available within this band include police calls at 1574, 1712 and 2450 kilocycles, amateur radio "phone" communications between 1800 and 2000 kilocycles, and aviation communications (phone) between 2500 and 3500 kilocycles.

C—*Short-Wave Range*—3900 to 10,000 kilocycles (77 to 30 meters). Within the limits of this range are included two of the internationally-assigned short-wave broadcast bands. These are known as the 49 and 31 meter bands. (The portion of this range from 8000 to 10,000 kilocycles, which includes the latter band, is preferably received on range D.)

D—*Short-Wave Range*—8,000 to 18,000 kilocycles (37.5 to 16.7 meters). This range embraces four of the standardized short-wave broadcast bands located at 31, 25, 19 and 16 meters, respectively.

(2) ***Station Selector*** (Upper Middle Knob with Crank)—Scale X (when included) and scales A and B on the illuminated dial are calibrated in kilocycles and traversed by the lower end of the moving pointer. The upper end of the pointer traverses scales C and D which are calibrated in megacycles (affix three ciphers to convert to kilocycles). The scale portions covered by the police bands on scale B and by the standardized short-wave broadcast bands on scales C and D are bracketed and clearly identified; each police band is designated by the letter "P" and each broadcast band by numerals corresponding to the wavelength followed by the letter "M," such as "49M."

(3) ***Power Switch and Tone Control*** (Lower Middle Knob)—The power switch operates at the counter-clockwise end of the control range. A slight clockwise rotation actuates the switch, causing illumination of the dial—indicative of normal operation. Continued clockwise rotation increases the treble response gradually.

(4) ***Volume Control*** (Right-hand Knob)—Sound level (volume) increases upon rotation of this control in a clockwise direction.

Procedure—The actual operation is simple and not unlike that of more conventional instruments designed for the reception of standard broadcast programs alone. However, the full possibilities of any short-wave receiver cannot be attained unless the user has a practical knowledge of short-wave transmission behavior and operating schedules. It is therefore recommended that the appended Notes on Short-Wave Reception and the inserted Short-Wave Broadcasting Station List and Program Schedule be studied carefully.

A brief outline of the recommended operating procedure should suffice:

1. Set the Range Switch for the frequency range within which the desired station is included.

2. Turn the Power Switch "on" and adjust the Tone Control to its extreme clockwise position—*for full-range reproduction.* Wait a few seconds in order that the tubes may attain the proper temperature before attempting further operation.

3. Advance the Volume Control to a position near the middle of its range and rotate the Station Selector until the dial indicator assumes a position coincident with the listed frequency of the desired station (on that scale which is designated by the letter corresponding to the range switch setting). Then turn the selector *very slowly* over a narrow range on each side of that setting, advancing the Volume Control further in a clockwise direction and repeating the tuning process, if necessary, until the signal is heard.

> NOTE—This procedure is important—especially so for short-wave reception. Because of the wide band of frequencies covered by the short-wave ranges, tuning is critical (sharp). A station of suitable strength often will be imperceptible if passed through rapidly or in a haphazard manner.

4. After receiving the signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Then readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. *This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.*

5. Adjust the Volume Control to the desired volume level.

> NOTE—The automatic volume control built into this instrument maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

6. Turn the Tone Control counter-clockwise if decreased treble response is preferred or to reduce noise interference if excessive.

7. When through operating, return the Tone Control to its counter-clockwise extremity, thus switching "off" the power.

Tubes—Improved results sometimes may be obtained by interchanging the positions of the RCA-58 Radiotrons. The power should be switched "off" before removing any tube from its socket. Spare tubes should be kept on hand.

NOTES ON SHORT-WAVE RECEPTION

While the design of this instrument is such that no previous experience or special skill is required for proper operation, its full possibilities can be realized only by those familiar with the general characteristics of transmission on the shorter wavelengths. The following notes are a summary of extensive data compiled mainly by experimentation and should be found both interesting and helpful, especially to beginners in the field of short-wave reception.

Broadcast transmission at 49 meters is most reliable when received from a distance of 300 miles (500 kilometers) or more, although good reception at distances greater than 1500 miles (2400 kilometers) can be expected only when a large portion of the signal path lies in darkness.

Thirty-one (31) meter stations afford greatest reliability of service to receivers situated at a distance exceeding 800 miles (1300 kilometers). Good reception from distant stations in this band is possible both day and night.

Reception from stations operating in the 25 meter band is most common when a span of 1000 miles (1600 kilometers) or more separates the receiver and transmitter. Such transmission over distances of less than 2000 miles (3200 kilometers), will be received best during daylight hours. The more distant stations, however, can still be heard well after nightfall under favorable conditions.

In the 19 meter band, stations situated at a distance of 1500 miles (2400 kilometers) or greater will be found most satisfactory. Signals in this band will generally be heard during daylight hours—rarely after nightfall or when any appreciable portion of the transmission path is in darkness. Wave-lengths below 19 meters are useful only when transmitted entirely through daylight and over long distances (2000 miles or more); ordinarily they cannot be received after sunset.

Transmitted signals of any wavelength are known to divide into two components—the "ground" wave and the "sky" wave. The former remains close to the earth's surface, providing reliable service only over short distances from the broadcasting station. The sky wave, however, travels into the higher layers of the atmosphere and is reflected back to the earth's surface at an appreciable distance from the station. With short-wave signals, the sky wave usually does not return within the radius covered by the ground wave, resulting in a so-called dead-spot region within which reception is impossible or extremely unsatisfactory. The length of the region wherein such conditions are effective is known as the skip distance, varying greatly from day to night and from summer to winter approximately as shown in Table I.

When attempting to receive distant or foreign stations, the time standards observed at various longitudes throughout the world must be considered. At 8:00 P. M. in New York or 7:00 P. M. in Chicago, it is of the next day—1:00 A. M. in London, 2:00 A. M. in most of Europe and 11:00 A. M. in Australia. On the American continents, therefore, regular evening broadcasts from Europe will be received in the late afternoon and from Australia in the early morning. Special programs, however, are frequently transmitted from European stations at times chosen for evening reception in America.

Although reception on the short wavelengths is less affected by atmospherics or static and good results may be had in midsummer even during a thunder storm, the reverse is true of man-made interference. Electrical machinery such as trolleys, dial telephones, motors, electric fans, automobiles, airplanes, electrical appliances, flashing signs and oil burners create far more interference to the shorter waves than to frequencies in the standard broadcast band (200 to 555 meters).

While the foregoing statements are valid, many other factors may so influence the transmission of short waves that exceptions are probable in certain locations. Experience in the operation of short-wave receivers in a given location is the best guide as to what to expect in reception at various times.

Any person interested primarily in short-wave reception will find membership in the International Short-Wave Club of great value. The club is a non-commercial organization and issues a monthly magazine (International Short-Wave Radio) which contains up-to-date information pertaining to short-wave broadcasting, amateur activities and commercial, police and aircraft services. The annual membership fee, including the magazine subscription, is one dollar ($1.00), U. S. Currency; single copies of the periodical may be procured by non-members for ten cents ($0.10) U. S. Currency, each. Address International Short-Wave Club, P. O. Box 713, Klondyke, Ohio, U. S. A.

Table I—Effect of Time of Day and Season of Year on Short-Wave Transmission*

Wavelength (Meters)	Ground Wave Range		Sky Wave (Mid-Summer) Approximate Range				Sky Wave (Mid-Winter) Approximate Range			
			Noon		Midnight		Noon		Midnight	
	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.	Miles	Kilom.
100	90	145	—90	—145	90—600	145—960	90—100	145—160	90—2500	145—4000
49	75	120	100—200	160—320	250—5000	400—8000	200—600	320—960	400—∞	640—∞
31	60	97	200—700	320—1125	1000—∞	1600—∞	500—2000	800—3200	1500—∞	2400—∞
25	50	80	300—1000	480—1600	1500—∞	2400—∞	600—3000	960—4800	2000—∞	3200—∞
19	35	56	400—2000	640—3200	2500—∞	4000—∞	900—4000	1450—6400	X	X
15	15	24	700—4000	1125—6400	X	X	1500—∞	2400—∞	X	X

∞—Unlimited distance.

X—Ordinarily cannot be heard.

* Time and season apply to transmitting station. Distances specified are based on relatively high-power transmission and favorable conditions of reception.

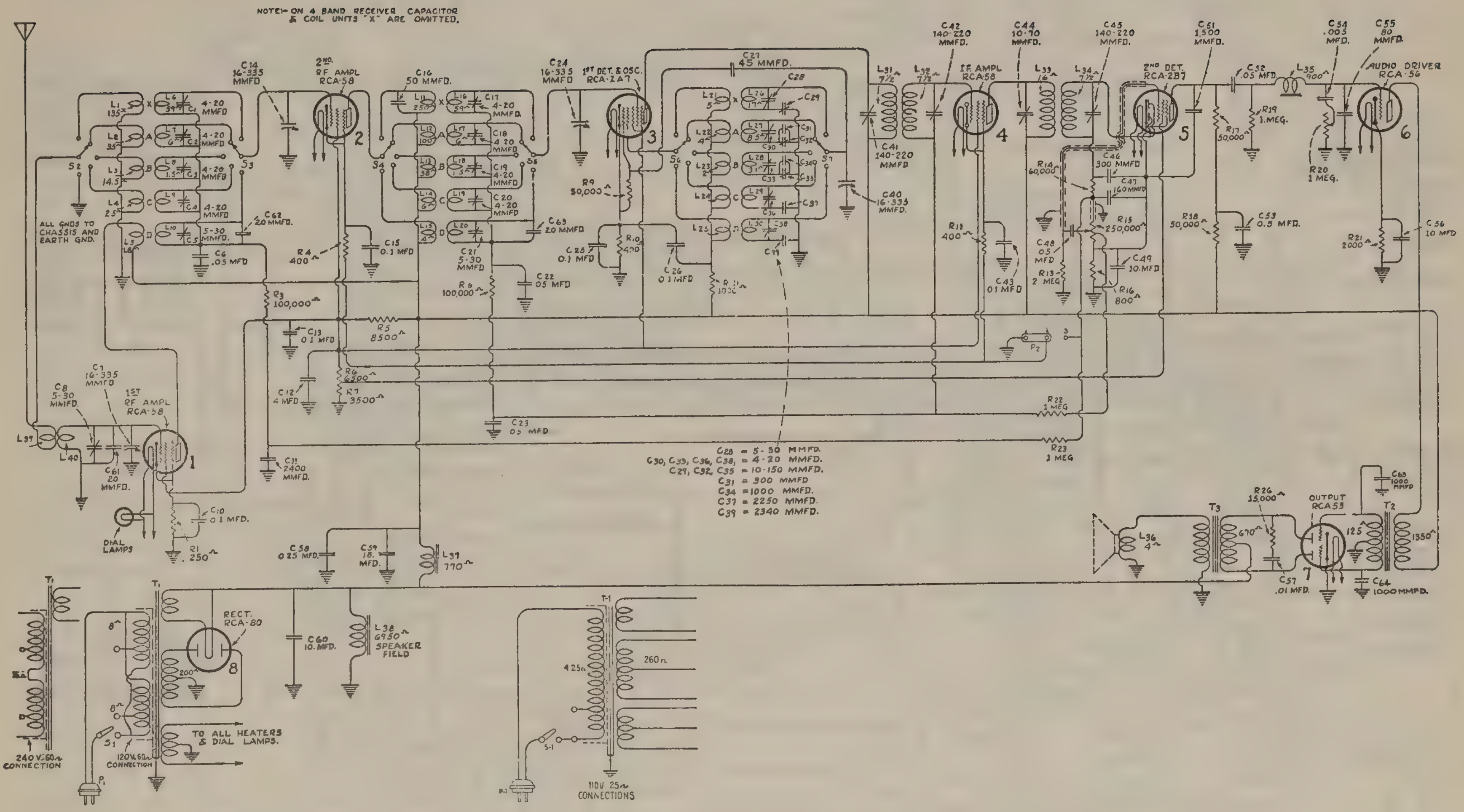

Figure A—Schematic Circuit Diagram

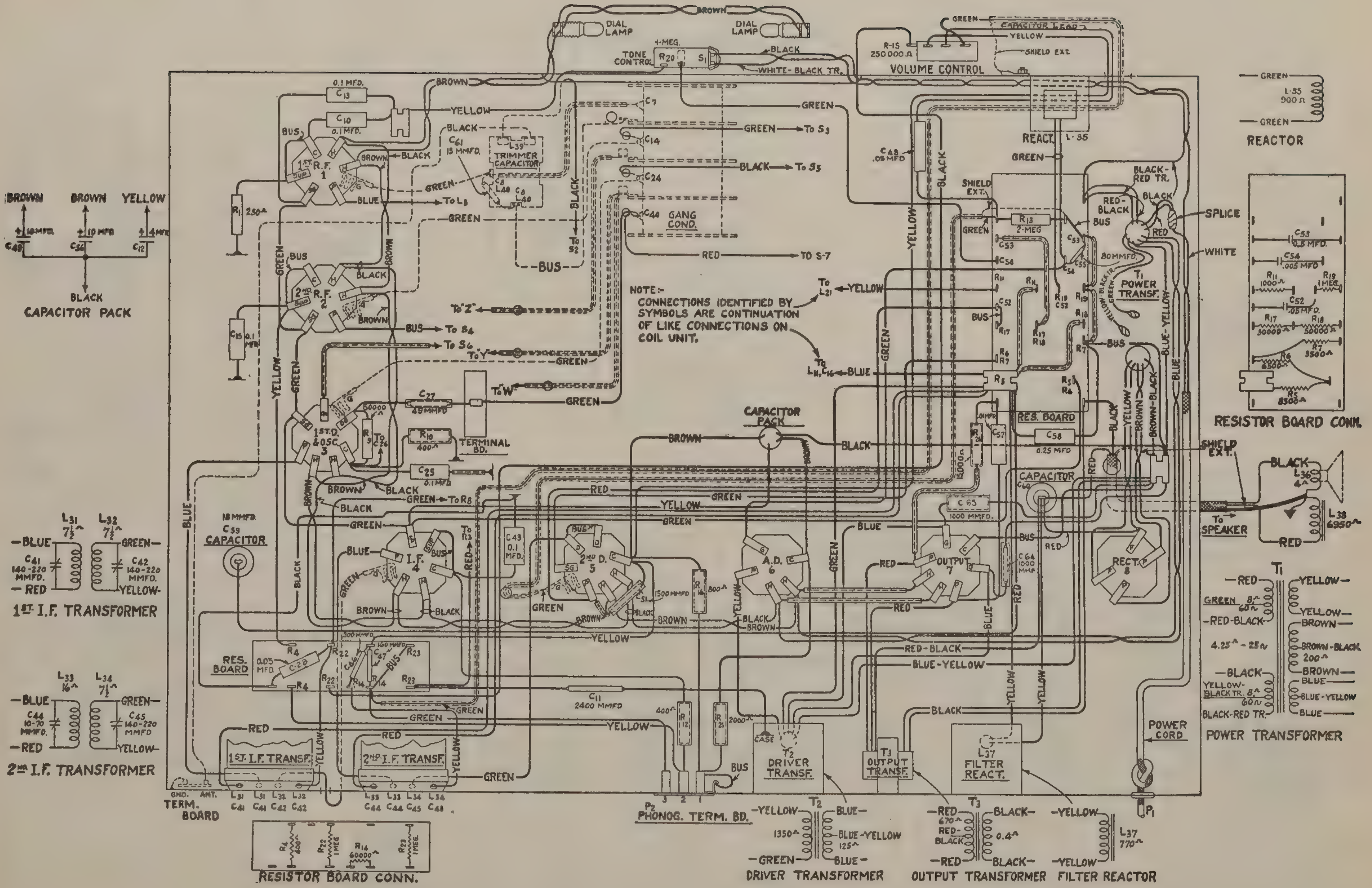

Figure B—Wiring Diagram of Chassis Assembly

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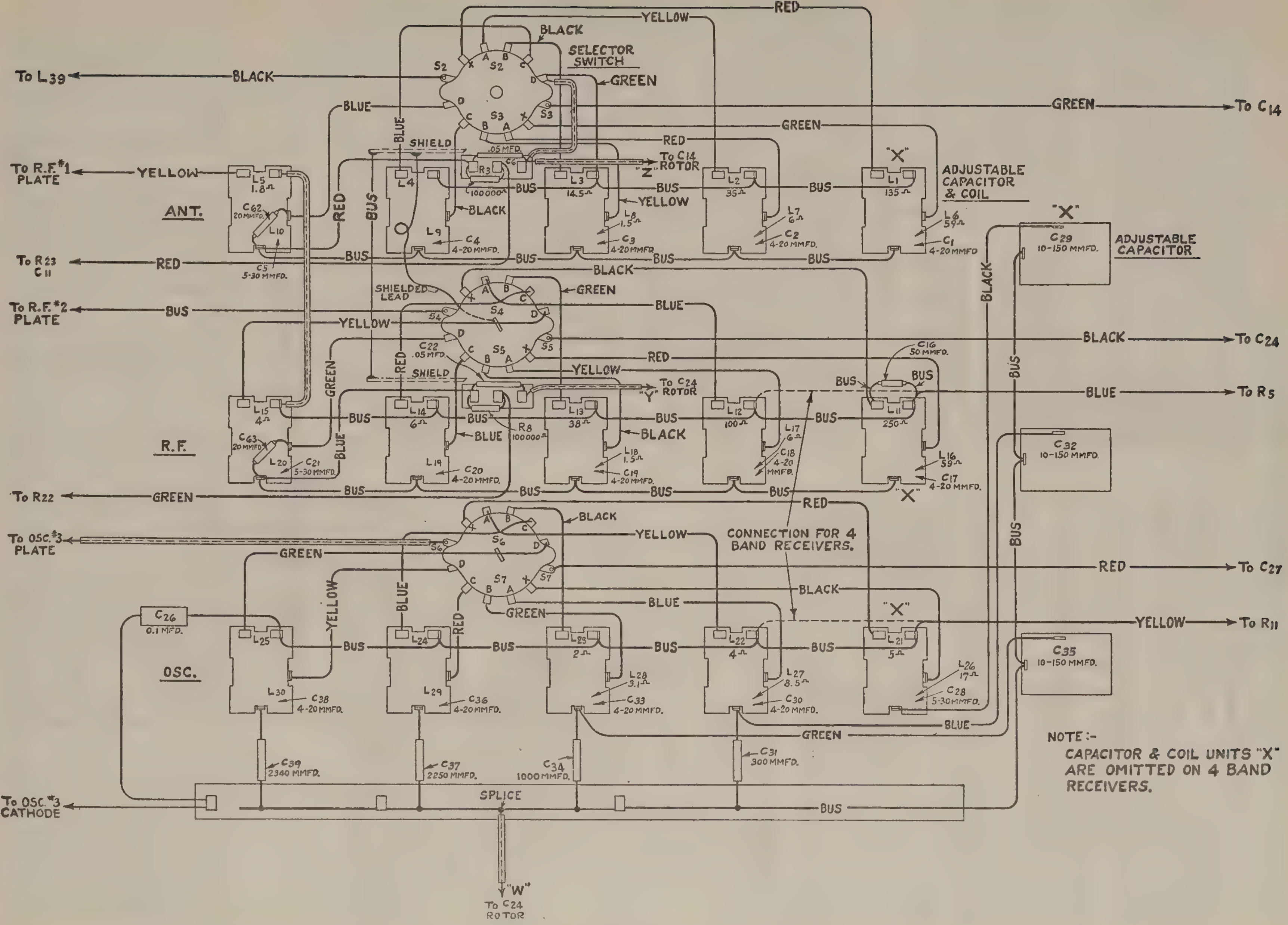


NOTE :-
CAPACITOR & COIL UNITS "X" ARE OMITTED ON 4 BAND RECEIVERS.

Figure C—Wiring Diagram of Coil Assembly

SERVICE DATA

Electrical Specifications

Voltage Rating.............100–125 Volts and 200–250 Volts

Frequency Rating
25–60 (100–125 Volt Only) and 50–60 Cycles

Power Consumption..........................110 Watts

Type and Number of Radiotrons
3 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 8

Type of Circuit
Straight Super-Heterodyne for all frequencies with Class "B" Output Stage.

Undistorted Output............................6 Watts

This all wave super-heterodyne receiver is of the continuous tuning type utilizing a straight super-heterodyne circuit in all bands. The bands are as follows:

Selector Switch Position	*Frequency Range (Kilocycles)*	*Wave Length Range (Meters)*
X	150–410	2000–732
A	540–1500	555–200
B	1500–3900	200–77.0
C	3900–10000	77.0–300
D	8000–18000	37.5–16.7

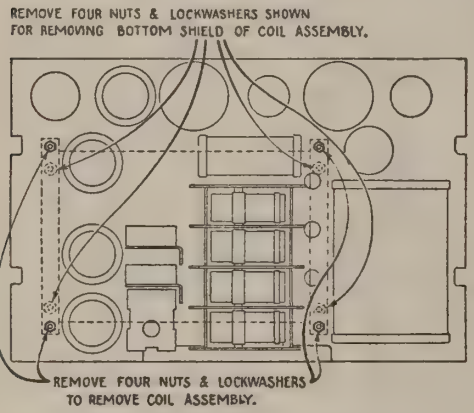

REMOVE FOUR NUTS & LOCKWASHERS SHOWN FOR REMOVING BOTTOM SHIELD OF COIL ASSEMBLY.
REMOVE FOUR NUTS & LOCKWASHERS TO REMOVE COIL ASSEMBLY.

Figure D—Location of nuts and lockwashers holding coil assembly

This receiver will be supplied in two models, one including all bands and one with band X omitted. These instructions, however, will cover both types of the receiver. The variations in the wiring for the two models are plainly shown in the illustrations. Figures A, B and C show the schematic circuit and wiring diagrams.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector using Radiotron RCA-2A7, an I. F. stage using RCA-58, a second detector and A. V. C. using RCA-2B7, an A. F. driver using RCA-56, and a Class "B" output stage using an RCA-53. The RCA-80 functions as the rectifier in the power supply circuits.

The foregoing tubes and circuit functions apply to bands X, A, B and C only. In the case of band D, an additional R. F. stage utilizing an additional Radiotron RCA-58 is used. This is to increase the sensitivity and image frequency selectivity and to reduce the interference caused by tube hiss and signals corresponding to the intermediate frequency.

The intermediate frequency is 445 K. C. The use of this frequency gives an especially good image frequency ratio and facilitates alignment of the oscillator at the higher frequency bands.

Mechanical Construction

The chassis consists of two major assemblies, which must be disassembled for certain repair work. These assemblies consist of the chassis proper, including the main frame, power transformer, etc., and the coil assembly. The coil assembly consists of fifteen transformers supported upon individual tubular bakelite forms, each fastened to a separate porcelain strip upon which the coil terminals are mounted with their associate trimmer capacitor. This entire assembly with the selector switch is grouped in a shielded compartment which is mounted in the base of the main chassis assembly.

In order to remove this assembly it is necessary to remove the four nuts shown in Figure D and unsolder the connections of the fifteen leads shown in Figure C at the points where they connect to the main chassis. The leads should be allowed to remain on the coil assembly. After this is done, the coil assembly may be removed and repairs to it or to the main chassis may be easily made. If a coil or its associated trimmer is to be replaced, then only the bottom shield of the coil assembly must be removed. This is done by removing the four nuts that hold it to the chassis studs. This is shown in Figure D.

Line-Up Capacitor Adjustments

This receiver is aligned in a similar manner to that of a standard broadcast band receiver. That is, the three main tuning capacitors are aligned by means of three trimmers in each band and on the three lowest frequency bands a series trimmer is adjusted for aligning the oscillator circuit. The other two bands do not require this low frequency trimmer, it being fixed in value. In the case of band D, it is necessary to adjust four trimmers due to the additional R. F. stage used.

TUBE SOCKET VOLTAGES

120 Volt A. C. Line

Radiotron No.	Control Grid to Cathode Volts	Screen Grid to Cathode Volts	Plate to Cathode Volts	Plate Current M. A.	Filament or Heater Volts
RCA-58, R. F.	**2.0	100	255	6.0	2.6
RCA-58, S. W. R. F.	**2.0	100	255	6.0	2.6
RCA-2A7, Det.-Osc.	**2.5	100	250	*5.0	2.6
RCA-58, I. F.	**2.0	100	255	6.0	2.6
RCA-2B7, 2nd Det.-AVC	**1.5	35	105	1.5	2.6
RCA-56, A. F. Driver	**12.0	—	245	6.0	2.6
RCA-53, Output	0	—	300	36.0	2.6
RCA-80, Rectifier	640 R. M. S. Plate to Plate			130 per Plate	5.0

* Voltages and current apply to detector portion of tube.

** These voltages cannot be measured because of the high resistance of the circuits.

The intermediate frequency amplifier is aligned in a similar manner to that of standard broadcast receivers except that it is aligned at 445 K. C. In order to properly align the receiver, it is essential that the Stock No. 9050 Test Oscillator be used. This oscillator covers the frequencies of 150 K. C. to 20,000 K. C. continuously, has good stability and includes an attenuator. In addition to the oscillator, a 300 ohm resistor for use as a "dummy" antenna, a non-metallic screw-driver such as Stock No. 7065, and an output meter are required. The output meter should be preferably a thermocouple galvanometer connected either across or in place of the cone coil of the loudspeaker.

To align the intermediate frequency circuits, connect the output of the external oscillator to the grid of the first detector. For the R. F. and oscillator adjustments, the oscillator output should be connected to the antenna and ground terminals of the receiver with the 300 ohm resistor inserted in series with the antenna lead. In many cases, however, the signal strength obtained with this direct connection will be too great to permit proper alignment, even at the minimum setting of the oscillator attenuator. When this is true, the external oscillator must be loose-coupled to the receiver in the following manner: Connect the 300 ohm resistor between the antenna and ground terminals of the receiver and attach a short length of wire to the antenna post. Lay the free end of this wire across the oscillator case, adjusting its position as necessary to obtain the degree of pickup required.

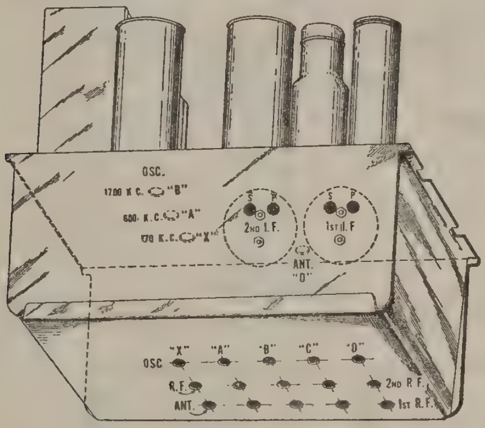


Figure E—Location of line-up capacitors

The output of the external oscillator should be at the minimum value necessary to obtain a deflection in the output meter when the volume control is at its maximum position. All adjustments are made for a maximum deflection in the output meter.

The accuracy of line-up of each band may be checked without touching the trimmer condensers, by the use of the tuning wand, Stock No. 6679.

One end of the wand consists of a brass cylinder. When this is inserted in a coil the effective inductance of the coil is lowered.

The other end of the wand contains a special finely divided iron suitable for use at radio frequencies. When this is inserted in a coil the inductance is raised.

To use the tuning wand a signal is first tuned in at the frequency at which a check is desired on alignment. The wand is then inserted slowly in the Antenna and R. F. transformers, using first one end and then the other end of the wand. Unless the alignment is perfect, it will be found that the power output indicated by the meter will be increased to a peak for a critical position of the wand in the coils.

The end of the wand required indicates whether the coil is high or low.

Of course, alignment correction at the high frequency end of a tuning range should be accomplished by the use of the trimmer condenser. If alignment correction should be required at the low frequency end of a tuning range it may be accomplished by sliding the end coil of the transformer. The winding farthest from the trimmer panel is pushed toward the trimmer panel to increase the inductance, and farther away to decrease the inductance. On band D coils, the last two or three turns may be pushed in a similar manner to obtain the proper inductance.

This adjustment should not be attempted unless a quite appreciable improvement will result (as shown by the tuning wand).

The following chart gives the details of all line-up adjustments. The receiver should be lined up in the order of the adjustments given on the chart. Refer to Figure E for the location of the line-up capacitors.

Pickup Connections

A terminal board is provided at the rear of the chassis for attaching a magnetic pickup to this instrument. Such connections are shown in Figures F, G and H.

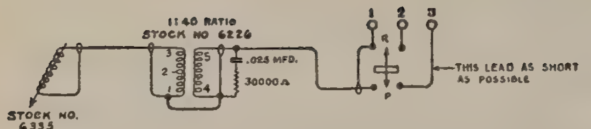
Transformer Connections

The power transformer of the 50–60 cycle receiver uses two tapped primary windings. By connecting them in parallel or in series, the receiver may be used either on 110 or 220 volt lines. Figure J shows the proper manner of making the various connections possible for this transformer.

The 25–60 cycle transformer uses only one 100–125-volt winding, a tap being provided for the lower voltages. Normally the transformer is connected for 115–125 volt lines, but the connection shown in Figure I may be used for 100–115 volt lines.

External Oscillator Frequency	Dial Setting	Location of Line-Up Capacitors	Position of Selector Switch	Adjust for	Number of Adjustments To Be Made
445 K. C.	Any setting that does not bring in station.	At rear of chassis.	Any position that does not bring in station.	Maximum output.	4
370 K. C.	370 K. C.	Bottom of chassis.	X	Maximum output.	3
175 K. C.	Set for signal.	Top of chassis.	X	Maximum output while rocking dial back and forth.	1
1400 K. C.	1400 K. C.	Bottom of chassis.	A	Maximum output.	3
600 K. C.	Set for signal.	Top of chassis.	A	Maximum output while rocking dial back and forth.	1
3900 K. C.	3900 K. C.	Bottom of chassis.	B	Maximum output.	3
1710 K. C.	Set for signal.	Top of chassis.	B	Maximum output while rocking dial back and forth.	1
10 M. C.	10 M. C.	Bottom of chassis.	C	Maximum output. (See Note)	3
15 or 18 M. C.	15 or 18 M. C.	Bottom and top.	D	Maximum output. (See Note)	4

NOTE—It is important to note, when aligning bands C and D, that two peaks will be observed on the trimmers for the oscillator and for the first detector. The correct oscillator peak is the one obtained using the lower trimmer capacitance, whereas the correct detector peak is the one obtained with the greater capacitance. It is essential that the proper peak be chosen, as otherwise tracking and sensitivity will be very poor at other frequencies. When adjusting the detector trimmer, the tuning capacitor should be rocked, since there is a reaction on the oscillator tuning.



PLACE INPUT TRANS. NOT OVER 2 FEET FROM CHASSIS

Figure F—Typical Pickup Connections

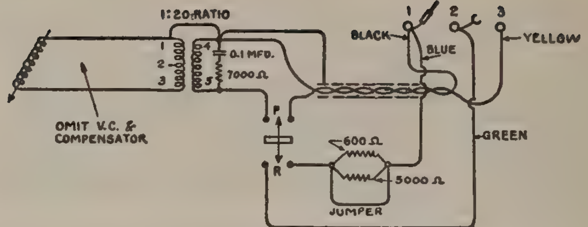


Figure G—Table Phonograph Connections

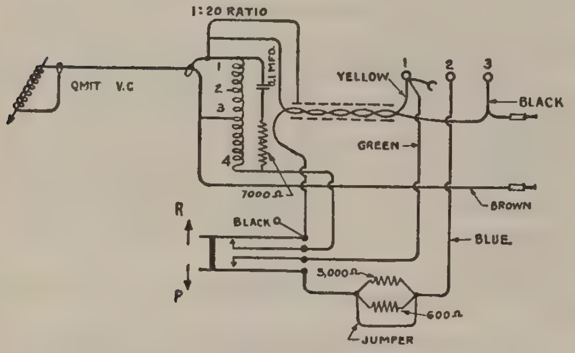
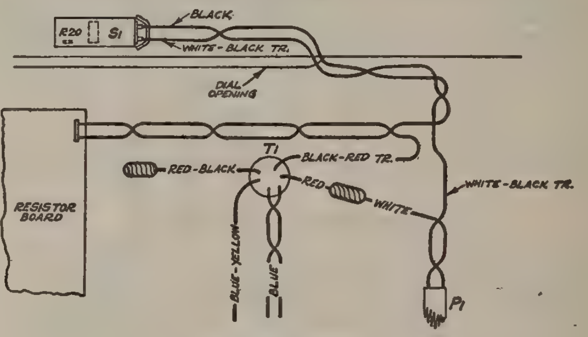


Figure H—End Table Connections



110V. 25~
CONNECTIONS

Figure I—100–115 Volt Connections of 25–60 Cycles Transformer

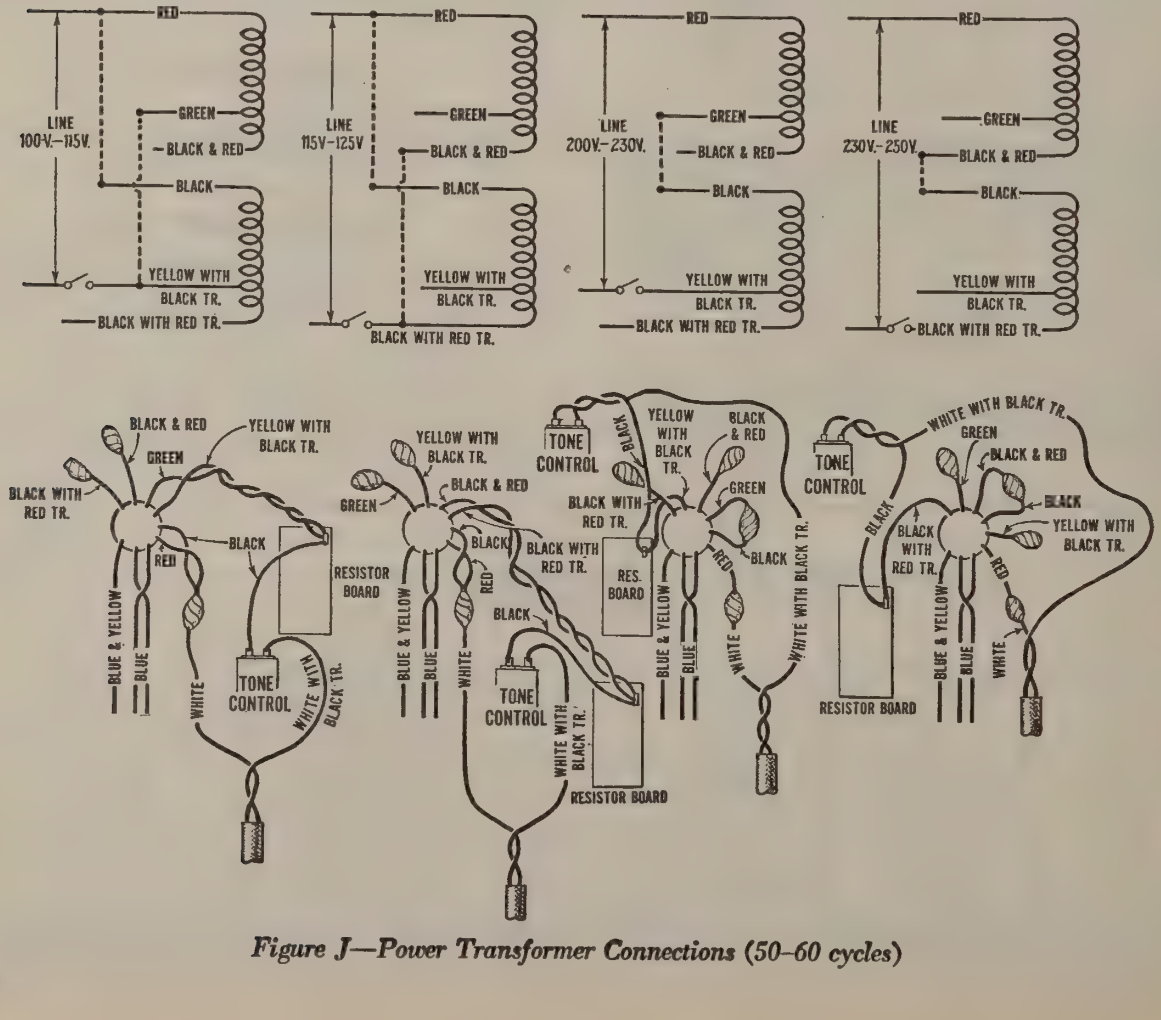


Figure J—Power Transformer Connections (50–60 cycles)

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3056	Shield—Output Radiotron shield—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R19, R22, R23)—Package of 5	1.00
3114	Resistor—50,000 ohms—Carbon type—¼ watt (R9)—Package of 5	1.00
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R3, R8)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R1)—Package of 5	1.00
3470	Resistor—6,500 ohms—Carbon type—1 watt (R6)—Package of 5	1.10
3472	Capacitor—.0024 mfd. (C11)	.32
3526	Resistor—2,000 ohms—Carbon type—½ watt (R21)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R16)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3555	Capacitor—0.1 mfd. (C26)	.36
3572	Socket—7-contact Radiotron socket—First detector and oscillator	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R17, R18)—Package of 5	1.00
3597	Capacitor—0.25 mfd. (C58)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt (R14)—Package of 5	1.00
3622	Shield—Second detector Radiotron shield	.36
3641	Capacitor—0.1 mfd. (C10, C15, C25)	.35
3683	Shield—Radiotron shield top	.20
3711	Capacitor—80 mmfd. (C55)	.40
3719	Socket—7-contact Radiotron socket	.30
3771	Resistor—8,500 ohms—Carbon type—3 watt (R5)	.25
3787	Capacitor—.01 mfd. (C57)	.30
3845	Capacitor—2,340 mmfd. (C39)	.50
3846	Capacitor—2,250 mmfd. (C37)	.50
3848	Capacitor—300 mmfd. (C31)	.30
3849	Capacitor—50 mmfd. (C16)	.30
3861	Capacitor—Adjustable trimmer (C29, C32, C35)	.78
3863	Resistor—400 ohms—Carbon type—½ watt (R4, R10, R12)—Package of 5	1.00
3864	Capacitor—300 mmfd. (C46)	.30
3865	Capacitor—160 mmfd. (C47)	.30
3866	Capacitor—1,500 mmfd. (C51)	.34
3867	Capacitor—0.1 mfd. (C13, C43)	.32
3888	Capacitor—.05 mfd. (C6, C22, C23, C52)	.25
3901	Capacitor—0.05 mfd. (C48)	.36
3931	Capacitor—45 mmfd. (C27)	.30
3942	Shield—I. F. Radiotron shield	.18
3973	Capacitor—1,000 mmfd. (C64, C65)	.34
4019	Capacitor—1,000 mmfd. (C34)	.34
4030	Bracket—Tone or volume control mounting bracket	.10
4033	Capacitor—20 mmfd. (C61, C62, C63)	.34
6112	Cushion—Rubber cushions for chassis—Package of 4	.25
6136	Resistor—3,500 ohms—Carbon type—1 watt(R7)—Package of5	1.10
6188	Resistor—2 megohm—Carbon type—½ watt (R13)—Package of 5	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt (R26)—Package of 5	1.00
6300	Socket—4-contact Radiotron socket	.35
6512	Capacitor—.005 mfd. (C54)	.28
6571	Capacitor—10 mfd. (C60)	1.20
6603	Condenser—4-gang variable tuning condenser (C7, C14, C24, C40)	3.80
6604	Capacitor—0.5 mfd. (C53)	.50
6605	Transformer—Output transformer (T3)	1.48
6606	Reactor—Filter reactor (L37)	1.66
6607	Reactor—Tone control reactor (L35)	1.14
6608	Transformer—Audio driver transformer (T2)	2.04
6609	Capacitor—18. mfd. (C59)	1.10
6610	Transformer—First intermediate frequency transformer (L31, L32, C41, C42)	1.55
6611	Transformer—Second intermediate frequency transformer (L33, L34, C44, C45)	1.62
6612	Volume control (R15)	1.20
6613	Drive—Variable condenser drive assembly—Complete	$1.00
6626	Capacitor pack—Comprising one 4. mfd., and two 10. mfd., capacitors (C12, C49, C56)	1.86
6627	Tone control (R20)	1.44
6628	Capacitor and coil—Antenna coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L39, L40, C8)	1.50
6629	Switch—5-band selector switch	3.48
6630	Switch—4-band selector switch	3.48
6631	Coil and capacitor assembly—Antenna coil and capacitor—150–410 kilocycles—5-band (L1, L6, C1)	2.16
6632	Coil and capacitor—R. F. coil and capacitor assembly—150–410 kilocycles—5-band (L11, L16, C17)	2.10
6633	Coil and capacitor—Oscillator coil and capacitor assembly—150–410 kilocycles—5-band (L21, L26, C28)	1.40
6634	Coil and capacitor—Antenna coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L2, L7, C2)	1.86
6635	Coil and capacitor—R. F. coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L12, L17, C18)	2.00
6636	Coil and capacitor—Oscillator coil and capacitor assembly—540–1,500 kilocycles—4 or 5 band (L22, L27, C30)	1 40
6637	Coil and capacitor—Antenna coil and capacitor assembly 1,500–4,000 kilocycles—4 or 5 band (L3, L8, C3)	1.56
6638	Coil and capacitor—R. F. coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L13, L18, C19)	1.66
6639	Coil and capacitor—Oscillator coil and capacitor assembly—1,500–4,000 kilocycles—4 or 5 band (L23, L28, C33)	1.40
6640	Coil and capacitor—Antenna coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L4, L9, C4)	1.54
6641	Coil and capacitor—R. F. coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L14, L19, C20)	1.60
6642	Coil and capacitor—Oscillator coil and capacitor assembly—4,000–10,000 kilocycles—4 or 5 band (L24, L29, C36)	1.34
6643	Coil and capacitor—Antenna or R. F. coil and capacitor assembly—8,000–18,000 kilocycles—4 or 5 band (L5, L10, C5—L15, L20, C21)	1.52
6644	Coil and capacitor—Oscillator coil and capacitor assembly 8,000–18,000 kilocycles—4 or 5 band (L25, L30, C38)	1.54
6675	Shaft—Shaft for condenser drive assembly—Comprising shaft, ball race with retainer and set screw	.35
6679	Wand—Tuning wand for R. F. and oscillator adjustments	
7065	Screwdriver—For R. F. or I. F. adjustment	.80
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—First detector and R. F. Radiotron shield	.25
8837	Support—Metal supports for chassis—Package of 4	.48
9042	Transformer—Power transformer—105–250 volt—50–60 cycles (T1)	6.84
9046	Transformer—Power transformer—105–125 volts—25–40 cycles	9.22
9050	Oscillator—Test oscillator—150 to 25,000 K. C.	33.50
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	MISCELLANEOUS	
3829	Knob—Volume control or tone control knob—Package of 5	1.10
3830	Knob—Station selector knob—Package of 5	1.08
3831	Knob—Range switch knob—Package of 5	1.08
3876	Cable—3-conductor for loudspeaker—4-band	.60
3878	Screws—No. 4–40–$\frac{3}{16}$ fillister head screw and washer for fastening station selector pointer—Package of 20	.25
3952	Escutcheon—Volume control escutcheon	.10
3953	Escutcheon—Range switch escutcheon—5-band	-10
3992	Escutcheon—Range switch escutcheon—4-band	.10
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6671	Cable—2-conductor shielded for loudspeaker—5-band	.36
6672	Screen—Translucent celluloid screen—For dial lamps—Package of 5	.30
6673	Pointer—Station selector pointer—Package of 5	.64
6677	Dial—Station selector dial—5-band—Package of 5	1.42
6678	Dial—Station selector dial—4-band—Package of 5	1.42
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone complete (L36)—Package of 5	6.35
9438	Reproducer complete	6.88
9439	Coil assembly—Field coil, magnet and cone support (L38)	5.22

Printed in U. S. A.

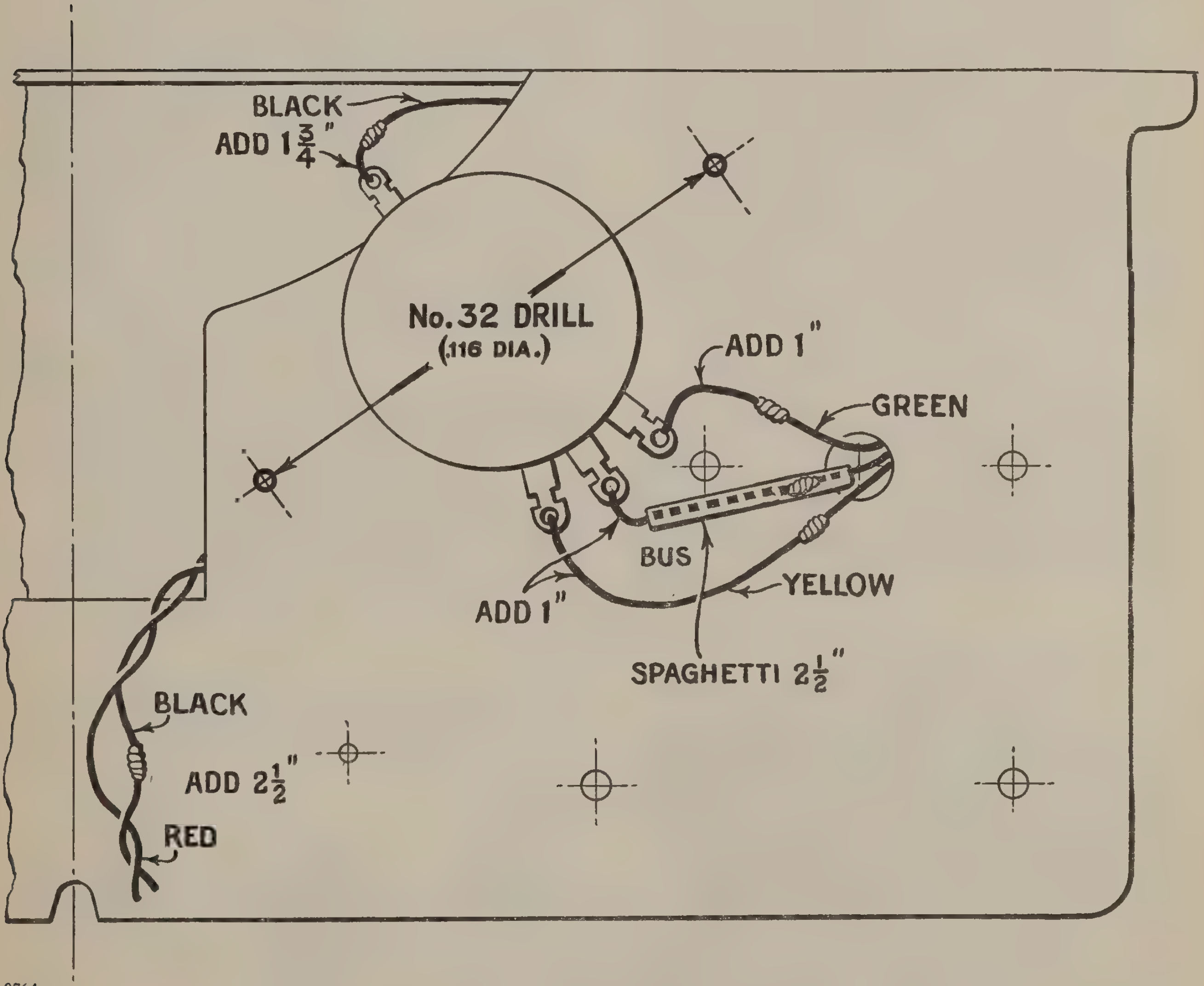
VOLUME CONTROL REPLACEMENT

The volume control on the All-Wave Receivers is now mounted on a bracket that makes replacement a simple and easy operation. However in older models, the volume control was mounted direct to the chassis from which location, replacement is difficult. For such replacements, we recommend that the shaft of the old volume control be sawed off and the new one mounted in the following manner:

(a) Saw off the old volume control. Use the following illustration for a template and drill two holes as shown.

(b) Mount the new volume control, Stock No. 6612 and Bracket Stock No. 4030 as shown. Two self-tapping screws and washers are furnished with the bracket.

(c) Unsolder the leads to the old volume control splice and connect them as shown. It will be noted that the power switch wiring to the tone control must be changed to enter through the large dial hole instead of the small hole.



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SERVICE DIVISION

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor Models 142-B and 241-B

8-Tube Battery-Operated Superheterodyne Receivers

INSTALLATION

Location—After unpacking the instrument, select a location where connections can be made conveniently to the antenna and ground. If the instrument is of the *table mounting* type, it should preferably be located where the battery cable will reach a compartment suitable for concealing the batteries (the *console* model provides space within the cabinet for all batteries).

Chassis—The four chassis-retaining screws (accessible beneath the cabinet of the table model and beneath the interior support shelf of the console model) must be loosened *just* sufficiently to permit the chassis to float freely on the rubber cushions. *Correct performance can be assured only when this adjustment has been properly made.*

Antenna and Ground—A well-insulated outdoor antenna, having a length of from 50 to 100 feet, including the lead-in wire, is recommended. It should be erected as high as conveniently possible and, in the event that electrical transmission lines are present in the immediate vicinity, should be located at a sufficient distance from such lines to prevent excessive interference. Although an outdoor antenna will provide best reception, especially in localities remote from broadcasting stations, an indoor antenna of short or medium length often will render satisfactory results and in certain cases may be the most practical.

A *good* ground connection is necessary for best performance of this receiver. The ground wire should be as short as possible and preferably attached to a cold-water pipe. In locations where a piped water supply is not available, an excellent alternative ground can be procured by attachment to a metallic stake driven 4 to 6 feet into moist earth. The surface of the pipe or metal stake should be scraped clean and an approved ground clamp used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Batteries—The following batteries are required:

"A" Battery—One Eveready Air Cell No. A-600, or 2-volt storage battery (individual cells of a 6-volt storage battery can be used if desired).

"B" Battery—Four 45-volt dry batteries. The cabinet of the *console* model is designed to hold large-size (heavy-duty) batteries, such as: Eveready No. 486 or 870; Burgess No. 21308 or 10308; or equivalent. Standard-size batteries, such as: Eveready No. 485 or 872; Burgess No. 22308 or 2308; or equivalent may be used if preferred, but will be less economical.

Make certain that the On-Off switch (small knob on left-hand side panel of table model—right-hand side panel of console model), is in the "off" position. Then connect the batteries *exactly* as shown by the battery connection diagram attached to the inside of the cabinet. Separate insulated wires are furnished for necessary connections between the "B" batteries. Make certain that the wire connected to the positive (+) terminal of the "A" battery is correct for the type of battery employed; the *solid-brown* wire must be used with the Air Cell and the *brown-and-black* wire with a storage battery. Insulate the end of the unused wire with tape.

Tubes—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with these tubes installed. The set, therefore, is ready to operate when it is removed from the shipping container and external connections are made as heretofore described.

If, when first installed, the receiver either performs imperfectly or fails to operate, it is probable that one or more of the tubes, shields, or dome terminal leads have been jarred loose in shipment. With the On-Off switch in the "off" position, refer to the tube location diagram on the license label (located on the bottom of the table model—inside the cabinet of the console model) and ***make certain:***

(1) That all tubes are in the proper sockets and pressed down firmly.
(2) That all shields are rigidly in place over the tubes shown by double circles on the diagram.
(3) That the spring connectors of the short flexible (grid) leads, shown on the diagram, are securely attached to the dome terminals of the proper tubes.

Fuses—The circuits are protected by two 0.5 ampere fuses connected in the "B+" (red and yellow) leads from the On-Off switch. Should the receiver at any time fail to operate, separate in turn each coupling-type fuse holder and examine the fuse (being careful not to lose the tubular spacer, which is necessary to insulate the fuse from its metal holder). If either fuse is burned out, check all battery connections and have all tubes tested by your dealer before installing a new fuse. Since these are special fuses, replacements should be obtained from your dealer—*do not use any other type fuse as a substitute.*

OPERATION

The operating controls on the front panel are shown in Figure 1. Proceed as follows:

1. Set the On-Off switch to the "on" position and the Local-Distant switch ("toggle" or "snap" switch on left-hand side panel near front of table model—on right-hand side panel near top of console model) to the "distant" position (upward on table model—toward front on console model).

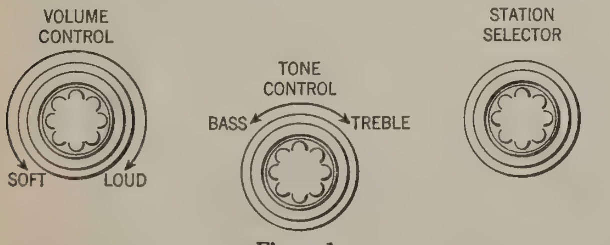

Figure 1

2. Advance the Volume Control to "Medium" and turn the Station Selector in either direction until a station is heard. (The dial scale is calibrated to facilitate location and identification of stations—add one cipher to scale markings to obtain frequency in kilocycles). If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the selector.

3. After receiving a desirable signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. *This setting provides the fine quality of reproduction possible with this instrument.*

NOTE—If the signal is extremely strong (as when received from a local broadcasting station), the effective range of the Volume Control may be found insufficient or the adjustment too critical. This condition usually can be remedied by changing the Local-Distant switch to the "local" position (downward on table model—toward rear on console model); in extreme cases it may be necessary to disconnect the antenna lead-in wire from the instrument.

4. Adjust the Volume Control to obtain the desired volume.

5. Set the Tone Control switch for the preferred tone quality. In the clockwise position, *full-range* reproduction will be obtained. To decrease treble response or to reduce noise interference (static), turn the knob to the counter-clockwise position.

6. When through operating, turn the On-Off switch to the "off" position.

IMPORTANT—To avoid damage to the tubes, always set the On-Off switch to the "off" position while changing tubes, batteries or fuses.

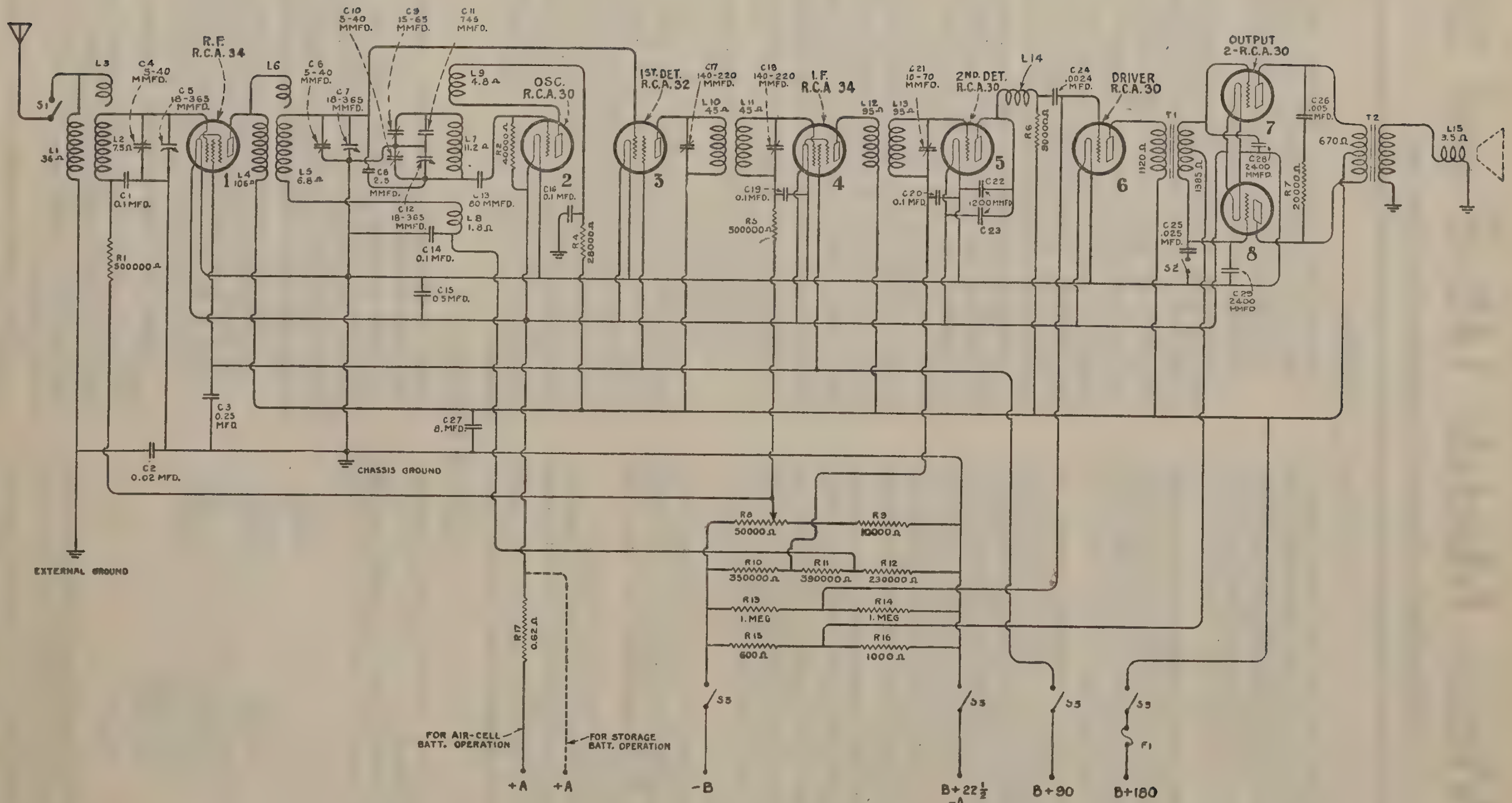

Figure A—Schematic Diagram—Note—Some models have additional fuse in 90-volt lead

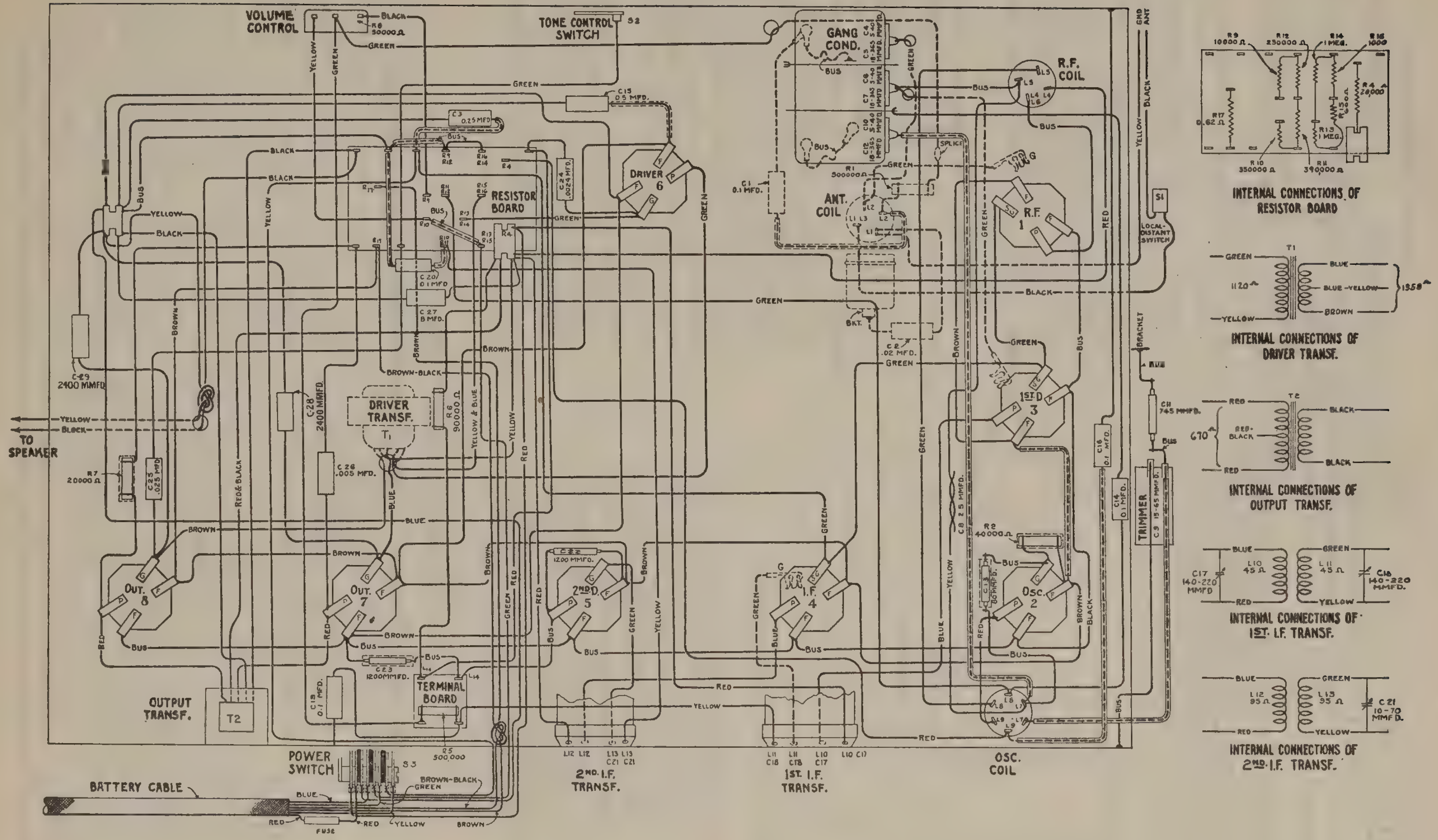

Figure B—Wiring Diagram. Note—Some models have additional fuse in 90-volt lead

SERVICE DATA

Total "A" Battery Current....................0.48 Ampere
Average "B" Battery Current........................15 M. A.
Type and Number of Radiotrons:
2 RCA-34, 1 RCA-32, 5 RCA-30—Total, 8
Tuning Range............................540–1500 K. C.
Maximum Undistorted Output....................1.0 Watt

This receiver is an eight tube battery operated Superheterodyne giving excellent performance. Features such as Class "B" output stage, two point tone control, permanent magnet dynamic loudspeaker, local-distant switch, adaptability for either Air Cell or storage battery operation and the inherent sensitivity, selectivity and tone quality of the Superheterodyne are incorporated in this instrument.

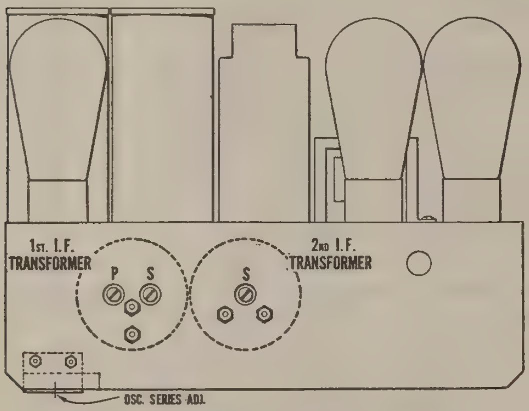

Figure C—Location of Line-up Capacitor

The circuit consists of an R. F. stage using Radiotron RCA-34, a Radiotron RCA-32 as a first detector, an oscillator using Radiotron RCA-30, an I. F. using Radiotron RCA-34, and a second detector utilizing Radiotron RCA-30. Two audio stages are used, the first using an RCA-30 and the second using two RCA-30 as a Class "B" output stage. The local distance switch is in the antenna circuit so that the antenna may be disconnected when receiving strong local stations. The volume control varies the control grid bias on the R. F. and I. F. Radiotrons. The tone control consists of a capacitor that is connected across one half of the secondary of the input audio transformer at the maximum low position. At the maximum high position this capacitor is disconnected.

Line-up Adjustments

I. F. Adjustments: Two transformers comprising three tuned circuits and one untuned circuit are used in the intermediate amplifier. These circuits are all tuned to 175 K. C. The screws are accessible from the rear of the chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Remove the oscillator tube and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that a slight deflection is obtained in the output meter.

(d) Adjust the secondary of the second and then the primary and secondary of the first I. F. transformers until a maximum deflection is obtained. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments: The three gang capacitor screws and 600 K. C. oscillator trimmer are accessible from beneath the receiver chassis. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 K. C. and 600 K. C., a non-metallic screw driver, such as Stock No. 7065, and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should point toward the small arrow at the edge of the dial. Then set the dial at 1400 K. C., the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained.

(c) With a non-metallic screw driver, adjust the three line-up capacitors accessible at the bottom of the receiver until maximum deflection is obtained in the output meter.

(d) Shift the oscillator frequency to 600 K. C. and tune the signal. Then adjust the 600 K. C. capacitor, until maximum deflection is obtained. The main tuning capacitor must be rocked back and forth while making this adjustment.

(e) Then realign at 1400 K. C. This completes the adjustments.

RADIOTRON SOCKET VOLTAGES

New "A" and "B" Batteries—No Signal Received—Volume Control at Maximum

Radiotron No.	Control Grid to Filament Volts	Screen Grid to Filament Volts	Plate to Filament Volts	Plate Current M. A.	Filament Volts
1. R. F.—RCA-34	*3.0	65	155	2.5	2.0
2. Oscillator—RCA-30	—	—	55	4.0	2.0
3. 1st Detector—RCA-32	*4.0	65	155	0.5	2.0
4. I. F.—RCA-34	*3.0	65	155	2.5	2.0
5. 2nd Detector—RCA-30	*10.0	—	*130	0.25	2.0
6. A. F.—RCA-30	*7.0	—	150	2.5	2.0
7. Power—RCA-30	*14.0	—	155	2.0 Total	2.0
8. Power—RCA-30	*14.0	—	155		2.0

*Voltages are obtained by means of high resistance dividers and it is not possible to accurately measure them with ordinary equipment.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2012	Capacitor—1,200 mmfd. (C22, C23)	$0.55
2734	Capacitor—745 mmfd. (C11)—Package of 5	1.50
2737	Escutcheon—Local-Distant switch escutcheon—Package of 5	.40
2747	Cap—Contact cap—Package of 5	.50
2816	Resistor — 1,000 ohms — Carbon type — ½ watt (R16)—Package of 5	1.00
2966	Resistor — 28,000 ohms — Carbon type — 1 watt (R4)—Package of 5	1.10
3048	Resistor—500,000 ohms—Carbon type—½ watt (R1, R5)—Package of 5	1.00
3056	Shield—Radiotron shield—R. F. or oscillator—Package of 2	.40
3076	Resistor—1 megohm—Carbon type—½ watt (R13, R14)—Package of 5	1.00
3078	Resistor — 10,000 ohms — Carbon type — ½ watt (R9)—Package of 5	1.00
3088	Knob—Operating switch knob—Package of 5	.50
3238	Screw—Set screw for switch knob—Package of 10	.25
3472	Capacitor—2,400 mmfd. (C24)	.32
3584	Ring—R. F., oscillator or antenna coil retaining ring—Package of 5	.40
3592	Knob—Station selector, tone or volume control knob—Package of 5	.80
3623	Shield—R. F., oscillator or antenna coil shield	.30
3639	Capacitor—0.02 mfd. (C2)	.25
3702	Capacitor—0.25 mfd. (C3)	.42
3711	Capacitor—80 mmfd. (C13)	.40
3748	Fuse—½ ampere fuse (F1)—Package of 5	.40
3765	Capacitor—0.025 mfd. (C25)	.34
3768	Screw—Volume indicator or station selector dial scale set screw—Package of 10	.35
3859	Socket—4-contact Radiotron socket—Audio driver and output Radiotrons	.30
3877	Capacitor—0.1 mfd. (C1, C14, C16, C19, C20)	.32
3881	Escutcheon—Station selector escutcheon	.42
3892	Resistor—600 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
3899	Escutcheon—Volume control escutcheon	.42
3908	Switch—Local-Distant switch—For table models	.68
3909	Switch—Local-Distant switch—For console models	.68
3910	Screw assembly—Chassis mounting screw assembly—Comprising 4 screws, 4 washers and 4 spacers	.36
3911	Resistor—40,000 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3912	Resistor—90,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3913	Switch—Operating switch—4-pole, single throw	2.18
3932	Capacitor—2,400 mmfd. (C28, C29)	$0.30
3946	Resistor—230,000 ohms—Carbon type—½ watt (R12)—Package of 5	1.00
3947	Resistor—390,000 ohms—Carbon type—½ watt (R11)—Package of 5	1.00
3948	Resistor—350,000 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
3950	Shield—Radiotron shield	.26
6176	Escutcheon—Operating switch escutcheon—Package of 5	.50
6300	Socket—4-contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6489	Coil—Antenna coil (L1, L2, L3)	.86
6512	Capacitor—0.005 mfd. (C26)	.28
6516	Connector—Fuse connector	.16
6548	Capacitor—8.0 mfd. (C27)	.95
6604	Capacitor—0.5 mfd. (C15)	.50
6709	Transformer—Output transformer (T2)	2.18
6710	Transformer—Audio driver transformer (T1)	2.22
6711	Coil—Choke coil (L14)	.66
6712	Transformer—First intermediate frequency transformer (L10, L11, C17, C18)	1.70
6713	Transformer—Second intermediate frequency transformer (L12, L13, C21)	1.92
6714	Volume control (R8)	1.20
6715	Dial—Volume indicator dial assembly	.44
6716	Switch—Tone control switch	.38
6717	Condenser—3-gang variable tuning condenser (C4, C5, C6, C7, C10, C12)	3.50
6718	Scale—Station selector dial scale assembly	.46
6719	Coil—R. F. coil (L4, L5, L6)	.90
6720	Coil—Oscillator coil (L7, L8, L9)	.78
6721	Cable—Main cable—For table models	1.18
6737	Resistor—0.62 ohms—Wire wound (R17)	.56
7062	Capacitor—Adjustable capacitor—15 to 70 mmfd. (C9)	.50
7065	Screw-driver—For R. F. and I. F. adjustments	.80
9050	Oscillator—Test oscillator—15 to 20,000 K. C.	33.50
	REPRODUCER ASSEMBLIES	
3949	Magnet	1.40
9428	Cone—Reproducer cone—Package of 5	5.00
9453	Reproducer complete	5.58
9454	Housing—Cone housing and core assembly	4.35

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor 220 and 222

Six-Tube Double-Range Superheterodyne Receivers

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. Before making the required external connections, however, it will be advisable to examine the tube installation as one or more of the tubes, shields or dome terminal clips may have been jarred loose in shipment. Refer to the tube location diagram printed on the license label inside the cabinet, and ***make certain:***

(1) That all tubes are in the proper sockets and pressed down firmly.
(2) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.
(3) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact clips are pressed down firmly.

NOTE—For the 2B7 Radiotron only, the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Antenna and Ground—An outdoor antenna having a length of from 25 to 75 feet, including the lead-in and ground wiring, is recommended. In many cases, however, an indoor antenna of short or medium length will be found satisfactory in buildings of non-metallic construction. The antenna should be well insulated from all objects and should be run neither close nor parallel to electric circuits inside or outside the building.

A good ground connection is essential for best performance. The ground lead should be as short as possible and preferably attached to a cold-water pipe. The pipe should be scraped clean and an approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both joints should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the license label.

OPERATION

Controls—The instrument has four operating controls located on the front panel of the cabinet. Viewing the front of the cabinet, these controls from left to right are:

(1) *Power Switch and Tone Control*—Power switch operates at counter-clockwise end of control range. A slight clockwise rotation actuates the switch, causing illumination of the dial—indicative of normal operation. Continued clockwise rotation increases the treble response gradually.

(2) *Station Selector*—Equipped with clock-type illuminated full-vision dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(3) *Frequency Range Switch*—Converts receiver for operation within either of two frequency ranges, as follows:

Counter-Clockwise Position—Standard broadcast band (540 to 1500 kilocycles)—Frequencies within this band are indicated upon the upper half of the dial.

Clockwise Position—Police Range (1600 to 3500 kilocycles)—Frequencies within this range are indicated upon the lower half of the dial and include the following major services:

(a) **Police Calls**—At dial settings near "170" for stations transmitting at 1712 kilocycles and near "250" for stations operating in the 2450 kilocycle band.
(b) **Amateur Radio "Phone"**—At dial settings between "180" and "200" (assigned band 1800–2000 kilocycles).
(c) **Aviation Communications (Phone)**—At dial settings between "250" and "350" (2500–3500 kilocycles).

(4) *Volume Control*—Sound level (volume) increases with rotation of this control in a clockwise direction.

Procedure—To operate the receiver, proceed as follows:

1. Set the Frequency Range Switch for the desired frequency band—see preceding paragraph (3).

2. Apply power by turning the Tone Control knob clockwise from the "off" position; continue rotation of this control to the opposite extremity for *full-range* reproduction. Set the Volume Control near the middle of its range.

3. Allow approximately one-half minute for the tubes to heat, then turn the Station Selector slowly over the range of the dial until a desirable station program is heard. If no station is heard, advance the Volume Control further in a clockwise direction and again rotate the Station Selector.

NOTE—The majority of stations in the 1600–3500 kilocycle band do not offer continuous programs. Police calls are usually intermittent at regular or irregular intervals. Local or strong stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1600–3500 kilocycles.

4. After receiving a signal, turn the Volume Control counter-clockwise until the volume is reduced to a low level. Now readjust the Station Selector accurately to the position mid-way between the points where the quality becomes poor or the signal disappears. ***This setting minimizes the proportion of background noise and provides the fine quality of reproduction possible with this instrument.***

5. Adjust the Volume Control to the desired volume level.

NOTE—The automatic volume control built into this instrument maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the Volume Control.

6. Turn the Tone Control counter-clockwise if reduced treble response is preferred, or if interference (static) is excessive.

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

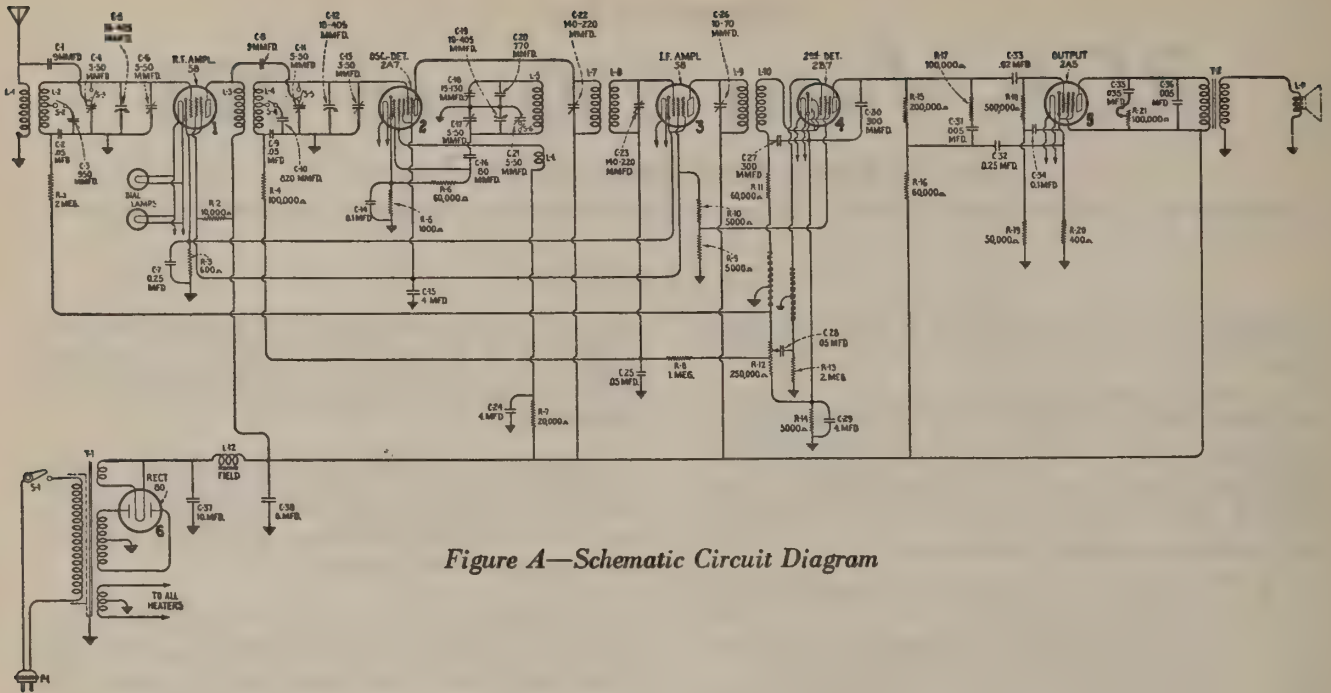

Figure A—Schematic Circuit Diagram

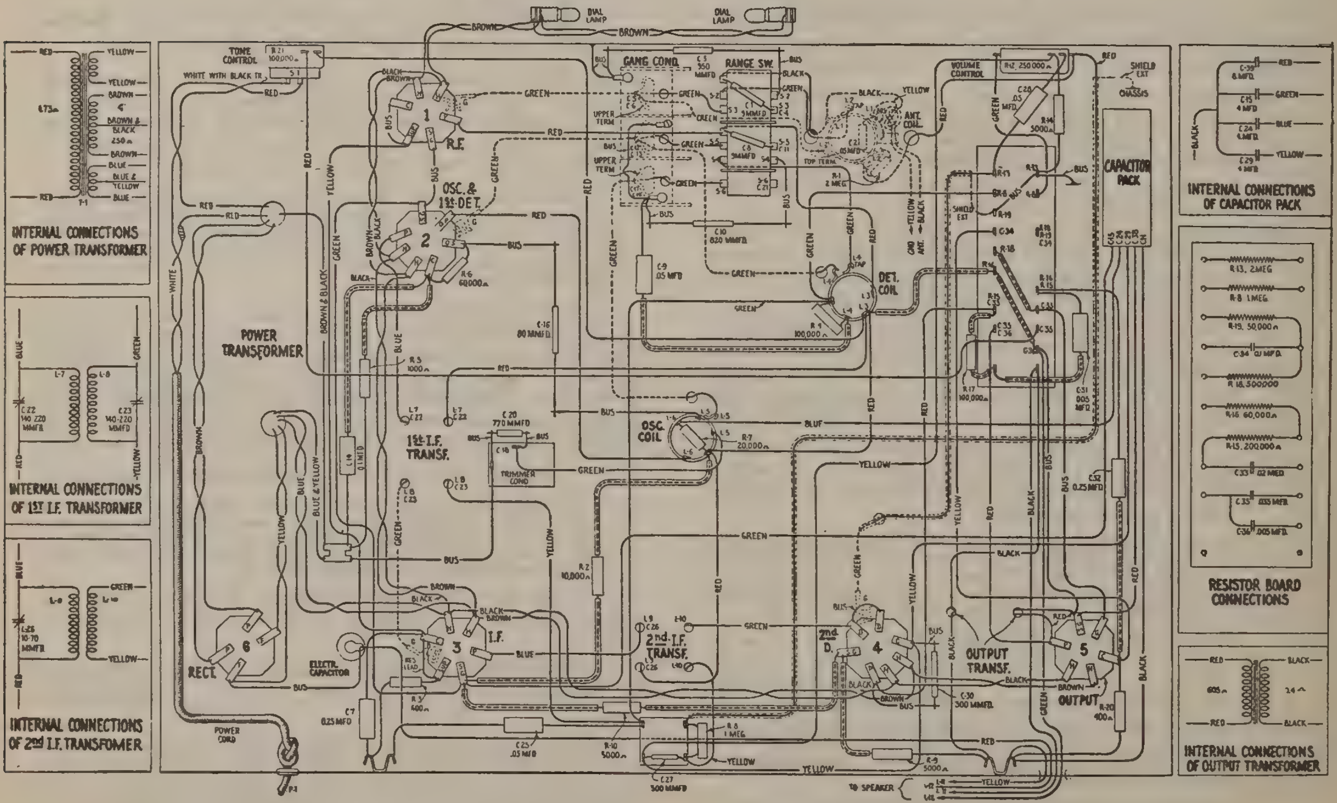

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Frequency Rating	25–60 and 50–60 Cycles
Power Consumption	60 Cycle 75 Watts, 25 Cycle 80 Watts
Number and Types of Radiotrons	2 RCA-58, 1 RCA-2A7, 1 RCA-2B7, 1 RCA-2A5, 1 RCA-80—Total 6
Undistorted Output	1.75 Watts
Frequency Range	540 K. C. to 1500 K. C. and 1600 K. C. to 3500 K. C.

This receiver is a six tube Superheterodyne incorporating features such as electro-dynamic loudspeaker, automatic volume control, single heater type Pentode output tube, continuously variable type tone control, "airplane" dial and the inherent sensitivity, selectivity and tone quality of the superheterodyne.

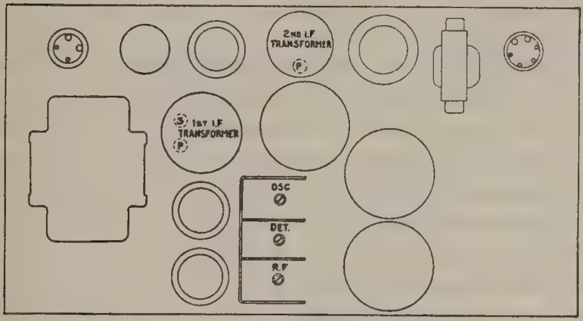

Figure C—Location of Line-up Capacitors

A feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1600 to 3500 K. C. band. Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the line-up capacitors.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-2B7 functioning as a combined second detector and automatic volume control, an output stage using the new heater Pentode RCA-2A5 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

Line-up Adjustments

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible from beneath the chassis as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang capacitor screws are located on the main tuning capacitor, accessible at the top of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator pointer should be set on the white inner radial line located at approximately 530 K. C. Then set the dial at 140, the oscillator at 1400 K. C. and connect the output meter across the cone coil. Adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum.

(c) After making the 1400 K. C. adjustment, shift the oscillator to 600 K. C. and tune in the signal. Adjust the 600 K. C. trimmer, accessible from the top of the chassis, for maximum output while rocking the gang-capacitor back and forth. Then again check the adjustment described in (b).

(d) With the Range Switch at the counter-clockwise position, adjust the three tuning condenser line-up capacitors until maximum deflection is obtained in the output meter. Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 244. The three line-up capacitors located on the Range Switch and accessible from the bottom of the chassis should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

RADIOTRON SOCKET VOLTAGES

115 Volts, A. C. Line—No Signal

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current M. A.	Heater Volts
1. RCA-58 R. F.	3.5	100	260	5.0	2.32
2. RCA-2A7 1st Det. Osc.	5.5*	100*	260*	2.0*	2.32
3. RCA-58 I. F.	3.5	100	260	5.0	2.32
4. RCA-2B7 2nd Det. A. V. C.	4.5	50	90	0.7	2.32
5. RCA-2A5 Power	16.5	255	245	34.0	2.32
6. RCA-80 Rectifier	725 RMS			73.0 Total	4.82

* The voltages and current refer to the detector part of the tube.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2747	Cap—Contact cap—Package of 5	$0.50
2816	Resistor—1,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
3048	Resistor—500,000 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt (R8)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R4, R17)—Package of 5	1.00
3529	Socket—Dial lamp socket	.32
3556	Capacitor—0.05 mfd.—Located on antenna coil (C2)	.34
3572	Socket—7-contact Radiotron socket	.38
3594	Resistor—50,000 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3616	Capacitor—300 mmfd. (C27, C30)	.34
3620	Capacitor—770 mmfd. (C20)	.40
3622	Shield—Radiotron shield—Second detector and output	.36
3630	Resistor—10,000 ohms—Carbon type—3 watt (R2)	.25
3639	Capacitor—0.02 mfd. (C33)	.25
3682	Shield—Radiotron shield—Oscillator and first detector	.22
3702	Capacitor—0.25 mfd. (C7, C32)	.42
3711	Capacitor—80 mmfd. (C16)	.40
3768	Screw—Square head—No. 6-32-¼″ set screw for condenser drive—Package of 10	.35
3783	Capacitor—9 mmfd. (C1, C8)—Package of 2	.50
3789	Shield—Radiotron shield—R. F. and I. F.	.25
3859	Socket—4-contact Radiotron socket	.30
3861	Capacitor—Adjustable capacitor	.78
3877	Capacitor—0.1 mfd. (C14, C34)	.32
3878	Screw—No. 4-40 screw and washer assembly for fastening station selector indicator—Package of 20	.25
3891	Resistor—5,000 ohms—Carbon type—1 watt (R9, R10)—Package of 5	1.10
3892	Resistor—600 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
3893	Resistor—5,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
3894	Capacitor—820 mmfd. (C10)	.36
3895	Capacitor—950 mmfd. (C3)	.40
3896	Capacitor—0.05 mfd. (C9, C25, C28)	.36
3897	Resistor—400 ohms—Carbon type—1 watt (R20)—Package of 5	1.10
3898	Knob—Station selector, volume control, tone control or range switch knob—Package of 5	.90
6188	Resistor—2 megohms—Carbon type—½ watt (R13)—Package of 5	1.00
6228	Resistor—200,000 ohms—Carbon type—½ watt (R15)—Package of 5	1.00
6242	Resistor—2 megohms—Carbon type—¼ watt—Located on antenna coil (R1)—Package of 5	$1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R6, R11, R16)—Package of 5	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
6512	Capacitor—0.005 mfd. (C31)	.28
6571	Capacitor—10.0 mfd. (C37)	1.20
6614	Glass—Station selector dial glass	.30
6615	Ring—Retaining ring for dial glass—Package of 5	.34
6616	Bezel—Metal bezel for station selector dial	.50
6620	Capacitor—Comprising one 0.005 and one 0.035 mfd. capacitors (C35, C36)	.50
6672	Screen—Translucent screen for dial light—Package of 5	.30
6673	Pointer—Station selector indicator—Package of 5	.64
6676	Socket—6-contact output Radiotron socket	.40
6680	Condenser—3-gang variable tuning condenser	3.80
6681	Tone control (R21, S1)	1.25
6682	Volume control (R12)	1.25
6683	Coil—Antenna coil (L1, L2, C2, R1)	1.38
6684	Coil—Detector coil (L3, L4)	1.10
6685	Coil—Oscillator coil (L5, L6)	1.05
6686	Transformer—First intermediate frequency transformer (L7, L8, C22, C23)	1.80
6687	Transformer—Second intermediate frequency transformer (L9, L10, C26)	1.78
6688	Shield—Antenna, detector or oscillator coil shield	.60
6689	Switch—Range switch	1.48
6690	Transformer—Output transformer (T2)	1.46
6691	Capacitor pack—Comprising one 8.0 mfd. and three 4.0 mfd. capacitors (C15, C24, C29, C38)	2.16
6693	Drive—Variable tuning condenser drive assembly complete	1.40
6722	Dial—Station selector dial—Package of 5	1.20
6789	Cable—4-conductor reproducer cable	
7485	Socket—6-contact Radiotron socket	.40
9441	Transformer—Power transformer—105-125 volts—50-60 cycles (T1)	4.92
9442	Transformer—Power transformer—105-125 volts—25-40 cycles	6.80
9443	Transformer—Power transformer—200-250 volts—50-60 cycles	5.04
10194	Ball—Steel ball for condenser drive assembly—Package of 20	.25
	REPRODUCER ASSEMBLIES	
8969	Cone—Reproducer cone (L11)—Package of 5	6.35
9444	Coil—Field coil, magnet and cone support (L12)	5.00
9445	Reproducer complete	7.14

RCA Victor Company, Inc.
Camden, N. J., U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor 260

Double-Range Bi-Acoustic Superheterodyne with Tonalite Control

INTRODUCTION

This ten-tube superheterodyne radio receiver offers superb musical reproduction—the result of many recent developments and improvements. Two of the new A. F. Pentode Radiotrons RCA-2A5 are used in the push-pull output stage. Acoustic "tone equalizer" chambers are built into the cabinet, effectually preventing sound distortion resulting from cabinet resonance. A tuning meter, having a translucent illuminated scale, is mounted just above the station selector dial. This meter permits *exact* visual tuning of stations and thus prevents faulty reproduction resulting from inaccurate tuning.

In addition to providing the usual broadcast entertainment from stations in the 540–1500 kilocycle band, this receiver can be tuned to receive stations transmitting in the range from 1500 to 2800 kilocycles. The latter range permits "listening in" to police calls, amateur radio "phone" communication, etc.—a fascinating diversion.

An outstanding feature of this instrument is the use of colored illuminated indicators for the operating controls, showing at a glance just where each control is set. This feature is new, being used for the first time in this series of models. Not only does the harmonious color illumination provide a modern and artistic refinement in appearance, but the indicators will be found of great usefulness in the manipulation of the receiver. Another improvement which has been initiated in this series of instruments is the recessing of the panel for the controls, reducing the extent of knob projection and rendering the controls less conspicuous. A double tone control is provided, also for the first time in this instrument series. Separate tone control knobs permit independent adjustment of the bass and treble response.

The automatic volume control minimizes the effects of "fading." This control also tends to maintain the volume level for which it is set when the dial is shifted from one station to another, thus eliminating "blasting" when passing through the settings of powerful stations.

The silent-tuning control (noise "suppressor" or "silencer") may be set for quiet tuning between station settings, without loss of ability to receive distant stations whose signals are above the background noise level.

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly. Particular attention should be given to the proper connections of the adjacent green and black leads in accordance with the diagram.

(d) That the lid is securely in place on the shield of the RCA-58 Radiotron designated by the heavy circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is essential for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

A terminal board is provided at the rear of the receiver chassis for connecting to the antenna and ground. Connect the antenna lead to the left-hand terminal (marked "ANT") and the ground lead to the right-hand terminal (marked "GND"). Tighten the terminals with a screw driver to insure permanent electrical connections.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label, located on the rear of the receiver.

OPERATION

The operating controls are shown in Figure 1. Proceed as follows:

1. Set the Frequency Range Switch for the band desired, as follows:

(a) *Counter-clockwise*—540–1500 kilocycle broadcast band. The dial scale reads directly in kilocycles for this band, using the large numerals.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the bottom of the dial (add two ciphers to obtain kilocycles). The following services are included in this band:

(1) **Police Calls**—Stations operating at 1712 kilocycles, and between 2400 and 2500 kilocycles.

(2) **Amateur Radio "Phone"**—Assigned band 1900—2000 kilocycles.

(3) **Aviation Reports, Airport Beacons, Etc.**—Assigned band 2000—2400 kilocycles.

(4) **Amateur Radio "CW" (Code)**—Assigned band 1715—1900 kilocycles. Signals of this class normally are unintelligible or inaudible with this type of receiver.

NOTE—The majority of stations in the 1400—2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540—1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400—2800 kilocycles.

2. Apply power by turning the Volume Control knob clockwise from the "off" position. Set this control near the middle of its range by observing the illuminated colored indicator associated with the control knob. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

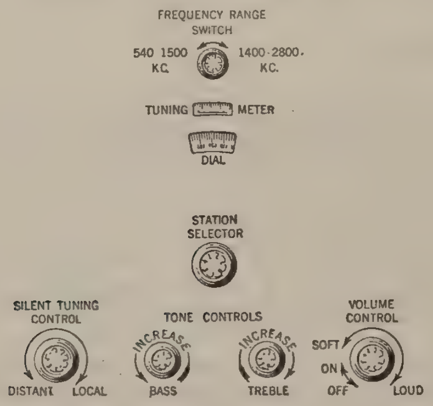

Figure 1

3. With the Silent-Tuning Control set in the extreme counter-clockwise position, turn the Station Selector to a point near the middle range of the dial, at which no station is heard within several scale divisions. Then turn the Silent-Tuning Control clockwise until the background noise (static) just disappears. (The setting of the Silent-Tuning Control is shown by the illuminated colored indicator associated with this control knob.)

NOTE—The adjustment just described provides quiet tuning, that is, *suppression of background noise between station settings*, and permits reception of all stations whose signals are above the existing noise level.

4. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

NOTE—If no stations are received throughout the complete range of the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent-Tuning Control counter-clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

5. When a desirable station signal is heard, accurate tuning *for best reproduction* is accomplished as follows:

(a) Turn the Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position at which the indicator of the tuning meter travels farthest to the right (as designated by the arrow on the meter scale). When receiving a powerful local station, the Station Selector dial should be set at the *center* of the scale *range* for which the meter deflection is maximum (this range may be narrowed somewhat by turning the Silent-Tuning Control clockwise).

(c) Adjust the Volume Control to obtain the desired sound level.

6. Adjust the two Tone Controls to obtain the tone shading preferred. The full range of musical reproduction is obtained with the right-hand knob all the way clockwise and the left-hand knob fully counter-clockwise, and is represented by full illumination of the tone color indicator which extends between the two knobs. Modifications of the tone range may be obtained as follows:

(a) To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise. The extent of high-frequency cut-off thus obtained is indicated by shading of the *yellow* illumination at the right-hand side of the tone color indicator.

(b) To reduce the low-frequency (bass) response, or to decrease low pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise. The extent of low-frequency cut-off thus obtained is indicated by shading of the *blue* illumination at the left-hand side of the tone color indicator.

(c) The *red* illumination at the center of the tone color indicator represents the middle range of musical response. This illumination is not cut off by rotation of either of the tone control knobs as described in the preceding paragraphs (a) and (b).

7. When through operating, interrupt the power by turning the Volume Control to the extreme counter-clockwise (off) position.

Radiotrons—Improved results may sometimes be obtained by interchanging Radiotrons of the same type, either RCA-56 or RCA-58, in their sockets. Spare Radiotrons should be kept on hand.

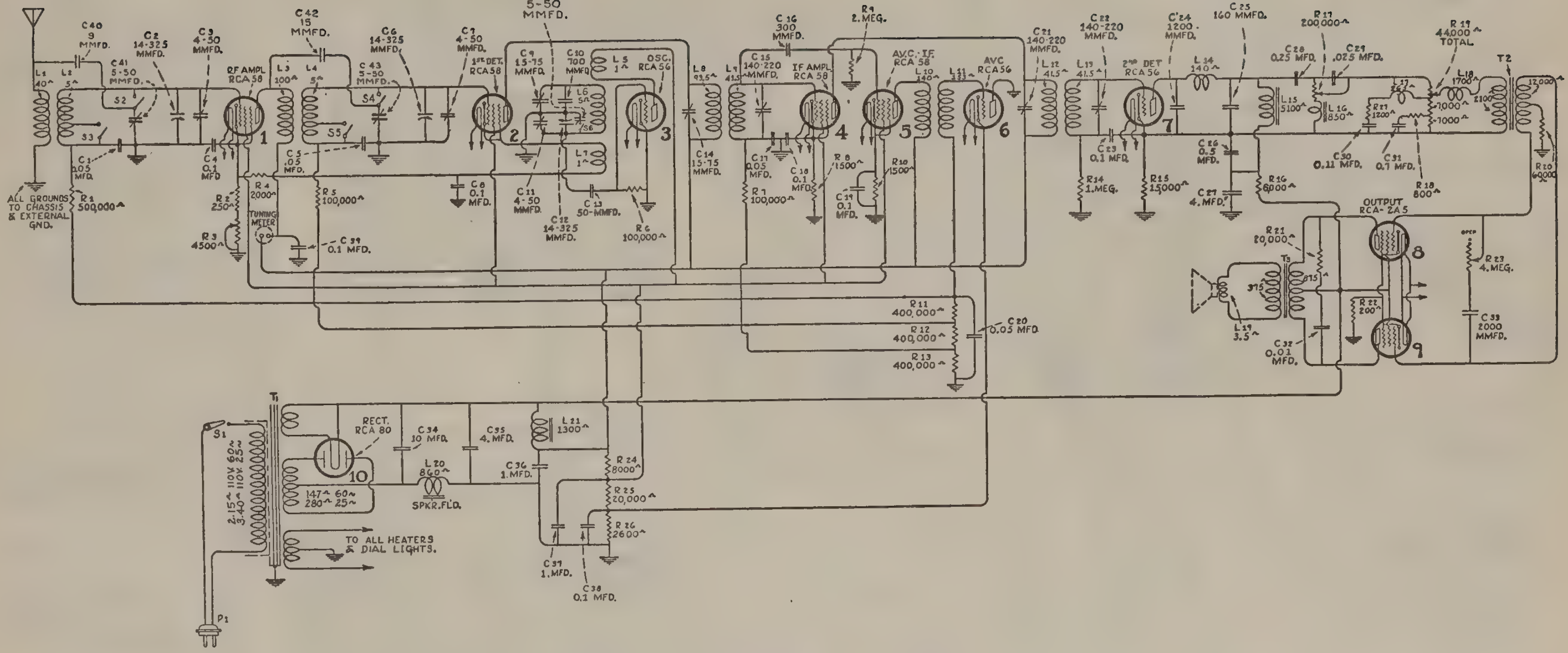

Figure A—Schematic Circuit Diagram

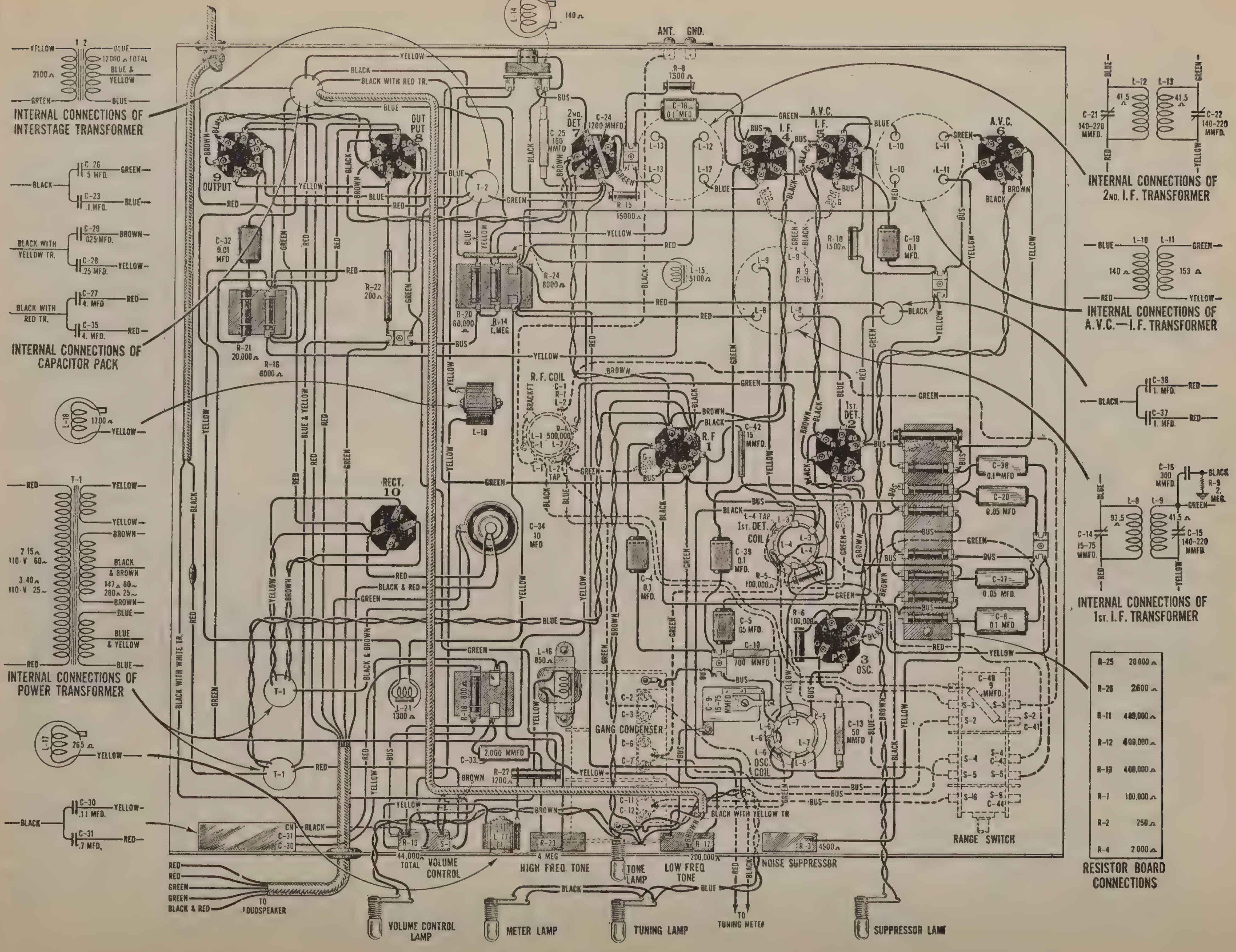

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Power Consumption	120 Watts
Type and Number of Radiotrons	3 RCA-56, 4 RCA-58, 1 UX-280, 2 RCA-2A5—Total, 10
Frequency Range	540 K. C.—1500 K. C. 1400 K. C.—2800 K. C.
Undistorted Output	4.0 Watts

This receiver is a ten tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, heater pentode output tubes operated as a push-pull stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

Figure A shows the schematic circuit, Figure B the wiring diagram, Figure C the location of the adjustable capacitors and Figure D, the loudspeaker wiring. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

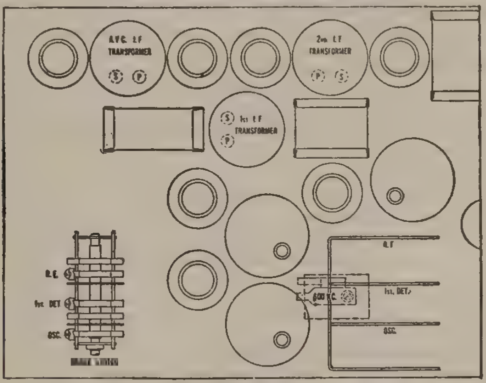

Figure C—Location of Adjustable Capacitors

R. F. And Oscillator Line-Up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C.—difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C., 1400 K. C. and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counter-clockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that an excessive reading on the output meter is not obtained.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a maximum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

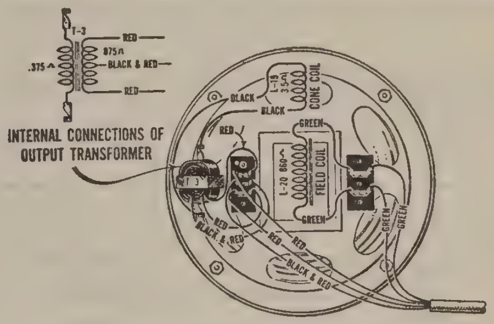

Figure D—Loudspeaker Wiring

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g) and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This may be a current squared galvanometer connected to the secondary of the output transformer instead of the cone coil, a 0.5 milliammeter connected in series with the plate supply to the second detector or a low range A. C. voltmeter connected across the reproducer unit cone coil.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a maximum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C.—No signal being received—Volume Control at minimum

Radiotron No.	Cathode to Control Grid Volts, D. C.	Cathode or Filament to Screen Grid Volts, D. C.	Cathode or Filament to Plate Volts, D. C.	Plate Current, M. A.	Heater or Filament Volts, A. C.
1. R. F.	3.0	100	230	7.0	2.4
2. 1st Detector	8.0	95	220	2.5	2.4
3. Oscillator	—	—	105	6.0	2.4
4. I. F.	7.5	100	225	2.5	2.4
5. A. V. C.—I. F.	7.5	100	225	2.5	2.4
6. A. V. C.	20.0	—	0	—	2.4
7. 2nd Detector	17.0	—	250	1.2	2.4
8. Power	18.0	255	245	33.0	2.4
9. Power	18.0	255	245	33.0	2.4

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
3024	Capacitor—9 mmfd—Package of 2	$0.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Package of 5	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Package of 5	1.00
3358	Resistor—3,000 ohms—Carbon type—½ watt—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt—Package of 5	1.00
3440	Resistor—4,500 ohms—Carbon type—½ watt—Package of 5	1.00
3455	Capacitor—0.01 mfd. capacitor	.44
3460	Capacitor—1,200 mmfd.	.30
3513	Capacitor—700 mmfd	.48
3526	Resistor—2,000 ohms—Carbon type—½ watt—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt—Package of 5	1.00
3528	Bracket—Volume control or noise suppressor indicator lamp bracket	.18
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3530	Coil—Second detector plate choke coil	.72
3531	Shutter—Volume control shutter	.50
3532	Shutter—Noise suppressor shutter	.50
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3546	Capacitor—150 mmfd.	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lock washers, 4 washers, 8 cushions and 4 spacers—One set	.68
3552	Resistor—200 ohms—Porcelain type—20 watts	.80
3553	Resistor—8,000 ohms—Porcelain type—20 watts	.80
3554	Resistor—1,200 ohms—Carbon type—½ watt—Package of 5	1.00
3555	Capacitor—0.1 mfd. capacitor—Tuning meter	.36
3556	Capacitor—0.05 mfd. capacitor	.34
3557	Capacitor—0.002 mfd. capacitor	.30
3558	Capacitor—50 mmfd. capacitor	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp mounting bracket	.25
3565	Socket—Dial lamp socket	.50
3598	Capacitor—0.1 mfd.	.36
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning Meter scale—Package of 5	.60
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft bushing and nut	.30
3747	Capacitor—15 mmfd	.36
3900	Resistor—2.600 ohms—Carbon type—½ watt—Package of 5	1.00
6114	Resistor—20,000 ohms—Carbon type—1 watt—Package of 5	1.10
6142	Resistor—6,000 ohms—Carbon type—½ watt—Package of 5	1.00
6192	Spring—Three gang tuning condenser drive cord tension spring—Package of 10	.30
6279	Resistor—15,000 ohms—Carbon type—½ watt—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	1.00
6298	Cord—Three gang tuning condenser drive cord—Package of 5	$0.60
6314	Capacitor—160 mmfd. —Package of 5	2.00
6316	Resistor—2,500 ohms—Carbon type—½ watt—Package of 5	1.00
6323	Shaft—Three gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6429	Capacitor pack—Comprising one 0.11 mfd. and one 0.7 mfd. capacitor in metal container	.98
6430	Capacitor pack—Comprising two 4.0 mfd., one 0.25 mfd., one 0.025 mfd., one 0.1 mfd. and one 0.5 mfd. capacitors in metal container	3.78
6431	Reactor—Filter reactor	1.92
6432	Transformer—Interstage audio transformer	3.69
6434	Reactor—Second detector plate coupling reactor	1.96
6435	Transformer—First intermediate frequency transformer	2.54
6436	Reactor—High frequency tone control compensating reactor	.70
6437	Coil—Oscillator coil assembly	1.24
6439	Reactor—High frequency tone control reactor	1.14
6440	Transformer—Second intermediate frequency transformer	1.94
6441	Transformer—Third intermediate frequency transformer	1.76
6442	Reactor—Volume control series reactor	.88
6443	Capacitor—10 mfd.	1.50
6444	Socket—Five contact Radiotron socket	.36
6445	Socket—Six contact Radiotron socket	.38
6446	Socket—Four contact Radiotron socket	.32
6447	Volume control—Complete with mounting nut	1.92
6448	Tone control—Low frequency tone control complete with mounting nut	1.04
6449	Tone control—High frequency tone control complete with mounting nut	1.06
6450	Rheostat—Noise suppressor rheostat	1.24
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency excutcheon and color screen	.92
6459	Cable—Braid covered—Five conductor reproducer cable	.54
6461	Meter—Tuning meter	2.14
6537	Switch—Range switch	1.30
6538	Coil—Antenna coil assembly	1.80
6539	Coil—Detector Coil	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning Meter bezel	.45
6786	Condenser—3 gang variable tuning condenser assembly	7.12
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screws and three dial mounting nuts	.35
7487	Shield—Radiotron tube shield	.25
7488	Shield—Tube shield top	.20
8978	Transformer—Power transformer—105–120 volts—50–60 cycles	8.50
8979	Transformer—Power transformer—105–120 volts—25–40 cycles	12.88
8980	Transformer—Power transformer—210–240 volts—50–60 cycles	9.36
8982	Capacitor pack—Comprising two 1.0 mfd. capacitors in metal container	1.44
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6455	Transformer—Output transformer	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone—Package of 5	6.35
9425	Coil assembly—Comprising field coil, magnet and cone support	4.94

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PL 2

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23572

Printed in U. S. A.

Instructions for

RCA Victor 280

Double-Range Bi-Acoustic Superheterodyne with Tonalite Control

INTRODUCTION

This twelve-tube superheterodyne radio receiver offers superb musical reproduction—the result of many recent developments and improvements. Abundant reserve power is provided by the two power amplifier Radiotrons RCA-59 used in the Class "B" output stage. Acoustic "tone equalizer" chambers are built into the cabinet, effectually preventing sound distortion resulting from cabinet resonance.

In addition to providing the usual broadcast entertainment from stations in the 540–1500 kilocycle band, this receiver can be tuned to receive stations transmitting in the range from 1500 to 2800 kilocycles. The latter range permits "listening in" to police calls, amateur radio "phone" communications, etc.—a fascinating diversion.

An outstanding feature of this instrument is the use of colored illuminated indicators for the operating controls, showing at a glance just where each control is set. A tuning meter, having a translucent illuminated scale, is mounted just above the station selector dial. This meter permits *exact* visual tuning of stations and thus prevents faulty reproduction resulting from inaccurate tuning. A double tone control is provided—separate knobs permit independent adjustment of the bass and treble response.

The automatic volume control minimizes the effects of "fading." This control also tends to maintain the volume level for which it is set when the dial is shifted from one station to another, thus eliminating "blasting" when passing through the settings of powerful stations.

The silent-tuning control (noise "suppressor" or "silencer") may be set for quiet tuning between station settings, without loss of ability to receive distant stations whose signals are above the background noise level.

The instrument panel is recessed for the controls and is provided with attractive tambour doors. With the doors closed while playing, all vestiges of mechanical appearance are removed, enhancing the listener's enjoyment.

INSTALLATION

Preliminary—Remove the packing material from the Radiotrons. Refer to the tube location diagram on rear of receiver, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly. Particular attention should be given to the proper connections of the adjacent green and black leads in accordance with the diagram.

(d) That the lids are securely in place on the shields of the two Radiotrons designated by a heavy outer circle on the diagram.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *essential* for satisfactory results.

A *good* ground connection is necessary for best performance of this receiver. The connection to ground should be as short and direct as possible and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

A terminal board, having three terminals, is provided at the rear of the receiver chassis for connecting to the antenna and ground. Connect the antenna lead to the middle terminal (marked "2") and the ground lead to the right-hand terminal (marked "3"). Tighten the terminals with a screw driver to insure permanent electrical connections.

NOTE—The left-hand terminal (marked "1") is provided for use only with *shielded lead-in* equipment (designed especially for this receiver) which can be purchased from and installed by the Dealer who sold this instrument. Such an installation is effective in eliminating or greatly reducing noise interference caused by local electrical disturbances ("man-made static").

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the voltage and frequency (cycles) specified on the rating label, located on the rear of the receiver.

FUSE—This instrument is protected by a fuse located at the rear of the chassis, under the metal cover marked "Caution: Remove Power Supply Before Removing Cover." If the fuse burns out, check the power supply connections and rating, and have all Radiotrons tested by your Dealer before installing a new fuse. This is a special fuse—obtain replacement fuses from your Dealer—*do not use any substitute for this fuse.*

In districts where the line voltage is always below 115 volts (225 volts for 200–250 volt models), the fuse should be set in the "110" position ("213" position for 200–250 volt models). Always disconnect the power cord from the A. C. outlet before removing the fuse cover.

OPERATION

The operating controls are shown in Figure 1. Proceed as follows:

1. Set the Frequency Range Switch for the band desired, as follows:

(a) *Counter-clockwise*—540–1500 kilocycle broadcast band. The dial scale reads directly in kilocycles for this band, using the large numerals.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the bottom of the dial (add two ciphers to obtain kilocycles). The following services are included in this band:

(1) **Police Calls—Stations operating at 1712 kilocycles, and between 2400 and 2500 kilocycles.**

(2) **Amateur Radio "Phone"—Assigned band 1900—2000 kilocycles.**

(3) **Aviation Reports, Airport Beacons, Etc.—Assigned band 2000—2400 kilocycles.**

(4) **Amateur Radio "CW" (Code)—Assigned band 1715—1900 kilocycles. Signals of this class normally are unintelligible or inaudible with this type of receiver.**

NOTE—The majority of stations in the 1400—2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540—1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400—2800 kilocycles.

2. Apply power by turning the Volume Control knob clockwise from the "off" position. Set this control near the middle of its range by observing the illuminated colored indicator associated with the control knob. Several seconds are required for the Radiotrons to heat before satisfactory reception is possible.

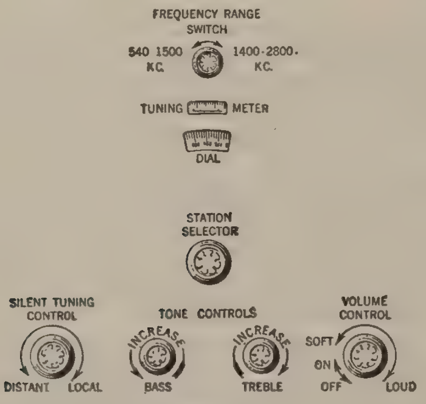

Figure 1

3. With the Silent-Tuning Control set in the extreme counter-clockwise position, turn the Station Selector to a point near the middle range of the dial, at which no station is heard within several scale divisions. Then turn the Silent-Tuning Control clockwise until the background noise (static) just disappears. (The setting of the Silent-Tuning Control is shown by the illuminated colored indicator associated with this control knob.)

NOTE—The adjustment just described provides quiet tuning, that is, *suppression of background noise between station settings*, and permits reception of all stations whose signals are above the existing noise level.

4. Turn the Station Selector slowly in either direction until a station is heard. (The dial scale is calibrated in kilocycles, for locating stations of known frequency assignment.)

NOTE—If no stations are received throughout the complete range of the dial, it is an indication that there are no station signals above the prevailing level of background noise. In this case it may be possible to tune in distant or weak stations by turning the Silent-Tuning Control counter-clockwise (in small steps) and continuing to rotate the Station Selector until signals are heard. When this is done, a higher level of background noise is, of course, to be expected.

5. When a desirable station signal is heard, accurate tuning *for best reproduction* is accomplished as follows:

(a) Turn the Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position at which the indicator of the tuning meter travels farthest to the right (as designated by the arrow on the meter scale). When receiving a powerful local station, the Station Selector dial should be set at the *center* of the scale *range* for which the meter deflection is maximum (this range may be narrowed somewhat by turning the Silent-Tuning Control clockwise).

(c) Adjust the Volume Control to obtain the desired sound level.

6. Adjust the two Tone Controls to obtain the tone shading preferred. The full range of musical reproduction is obtained with the right-hand knob all the way clockwise and the left-hand knob fully counter-clockwise, and is represented by full illumination of the tone color indicator which extends between the two knobs. Modifications of the tone range may be obtained as follows:

(a) To reduce the high-frequency (treble) response, or to decrease the background noise (static) interference *on station settings*, turn the right-hand tone control knob counter-clockwise. The extent of high-frequency cut-off thus obtained is indicated by shading of the *yellow* illumination at the right-hand side of the tone color indicator.

(b) To reduce the low-frequency (bass) response, or to decrease low pitched hum present on the signals of some stations, turn the left-hand tone control knob clockwise. The extent of low-frequency cut-off thus obtained is indicated by shading of the *blue* illumination at the left-hand side of the tone color indicator.

(c) The *red* illumination at the center of the tone color indicator represents the middle range of musical response. This illumination is not cut off by rotation of either of the tone control knobs as described in the preceding paragraphs (a) and (b).

7. When through operating, interrupt the power by turning the Volume Control to the extreme counter-clockwise (off) position.

Radiotrons—Improved results may sometimes be obtained by interchanging Radiotrons of the same type, either RCA-56 or RCA-58, in their sockets. Spare Radiotrons should be kept on hand.

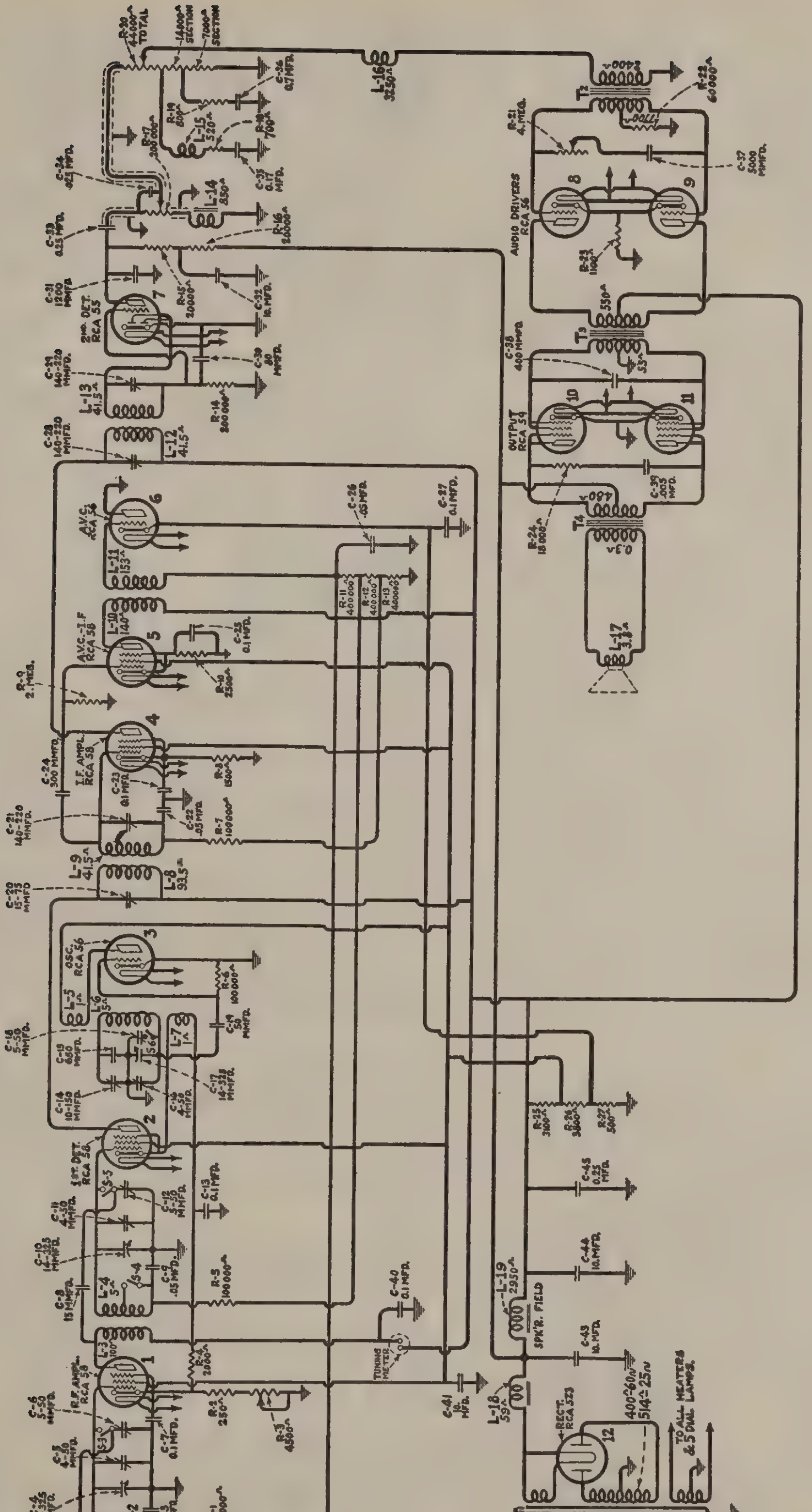

Figure A—Schematic Circuit

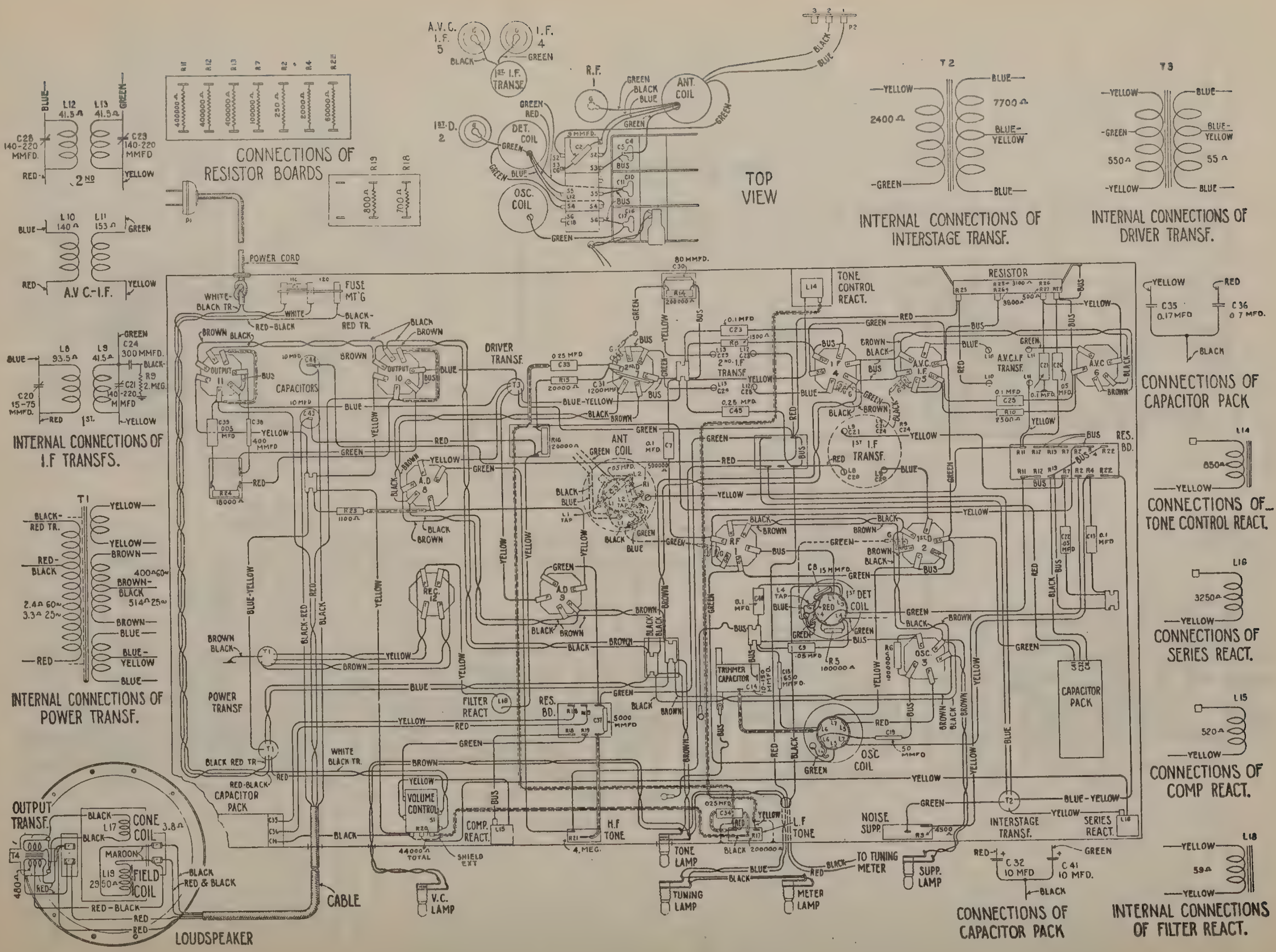

Figure B—Wiring Diagram

SERVICE DATA

Electrical Specifications

Voltage Rating	105–125 Volts
Power Consumption	120 Watts
Type and Number of Radiotrons	4 RCA-56, 4 RCA-58, 1 RCA-55, 2 RCA-59, 1 RCA-5Z3—Total 12
Frequency Range	540 K. C.-1500 K. C.—1400 K. C.-2800K. C.
Undistorted Output	10.0 Watts

This receiver is a twelve tube Super-Heterodyne radio receiver. Features such as illuminated controls, improved automatic volume control, noise suppressor, compensated volume control, class B output stage, acoustically correct cabinets and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne are included in this instrument.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

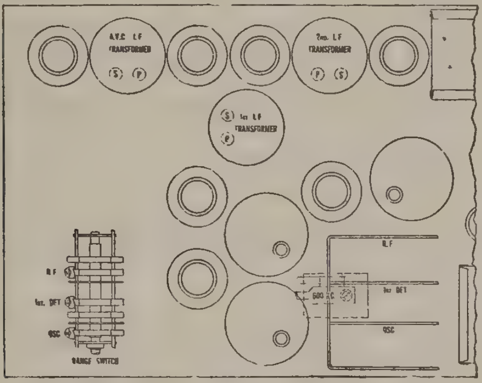

Figure C

Figure A shows the schematic circuit, Figure B the wiring diagram and Figure C the location of the adjustable capacitors. The Radiotron socket voltages, the line-up procedure and the replacement parts are given on the following pages.

R. F. and Oscillator Line-up Capacitor Adjustments

Four adjustable capacitors are provided for aligning the R. F. circuits and adjusting the oscillator frequency so that the oscillator will maintain a constant frequency—175 K. C. —difference from that of the incoming signal. Poor quality, insensitivity, poor A. V. C. action and possible inoperation of the receiver may be caused by these capacitors being out of adjustment.

If the other adjustments have not been tampered with—the intermediate transformer tuning capacitors—the following procedure may be used for aligning these capacitors.

(a) Procure an R. F. Oscillator giving a modulated signal at 600 K. C. 1400 K. C., and 2440 K. C. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket. This should be a tube that is otherwise normal in all respects, but having one heater prong removed. Insert this tube in the A. V. C. socket.

(d) First check the chassis and carefully ascertain that the dial pointer reads exactly at the first line on the scale when the tuning capacitor rotor plates are fully meshed with the stator plates.

(e) Place the oscillator in operation at exactly 1400 K. C. and couple its output to the antenna. Set the Range Switch counterclockwise and the dial scale at exactly 1400. Connect the output meter to the set and place the volume control and suppressor control, if noise level will permit, at its maximum position. Adjust the oscillator input so that only a slight reduction in current is obtained in the output meter.

(f) With a suitable socket wrench—the nuts are at ground potential—adjust the oscillator, first detector and R. F. line-up capacitors, until a minimum deflection is obtained in the output meter.

(g) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 1200 and the Range Switch in the clockwise position. The line-up capacitors on the Range Switch are adjusted for minimum output at this frequency.

(h) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a slight deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a minimum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(i) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (f), (g), and then (h).

So adjusted, the R. F. circuits are properly aligned and the oscillator will maintain a constant frequency difference from the incoming R. F. signal.

I. F. Tuning Capacitor Adjustments

Although this receiver has two I. F. stages, one for the second detector and one for the A. V. C., only two of the three I. F. transformers are tuned by adjustable capacitors and require adjustment. The stage used for the A. V. C. is broadly tuned and does not require any adjustment.

The transformers are all tuned to 175 K. C. and the circuits broadly peaked.

A detailed procedure for making this adjustment follows:

(a) Procure a modulated R. F. Oscillator that gives a modulated 175 K. C. signal. Also procure a non-metallic screw driver such as Stock No. 7065.

(b) An output meter is necessary. This should be a 0-10 milliammeter connected in series with the plate supply to the second detector.

(c) A dummy Radiotron RCA-56 is necessary to substitute for the one normally used in the A. V. C. socket.

(d) Remove the oscillator tube and make a good ground connection to the chassis. Place the oscillator in operation and couple its output from the control grid of the first detector to ground. Adjust the oscillator output, with the receiver volume control at maximum, until a slightly reduced deflection is obtained in the output meter.

(e) Refer to Figure C. Adjust the secondary and primary of the second and then the first I. F. transformer until a minimum deflection is obtained in the output meter. Go through these adjustments a second time as a slight readjustment may be necessary.

When the adjustments are made the set should perform at its maximum efficiency. However, due to the interlocking of adjustments, it is good practice to follow the I. F. adjustments with the R. F. and oscillator line-up capacitor adjustments. The correct method of doing this is given in the preceding section.

Antenna Connections

It will be noted that three antenna terminals are provided at the rear of the receiver chassis. Two of these will normally be used for the usual antenna and ground connections while the third one is for use in connection with a shielded antenna system. The tap eliminates the need of the transformer usually used for coupling the shielded line to the radio receiver.

RF-5203 shield kit which comprises a combination antenna insulator, lightning arrester, transformer assembly, and 75 feet of shielded wire is recommended. When such an antenna system is used, it is necessary to connect a 200 mmfd. capacitor between terminals 1 and 2. This prevents the first R. F. circuit from being detuned and results in maximum gain from the antenna. This capacitor is included with the RF-5203 Kit. However, in event an assembly of parts from other type kits are used, it must be added.

RADIOTRON SOCKET VOLTAGES

120 Volt A. C. Line—Volume Control and Sensitivity Control at Maximum—No signal being received

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	3.1	97	212	7.5	2.5
RCA-56 Osc.	—	—	100	6.0	2.5
RCA-58 1st Det.	9.5	91	206	2.8	2.5
RCA-58 I. F.	7.5	93	208	4.0	2.5
RCA-58 A. V. C.–I. F.	8.5	92	207	3.0	2.5
RCA-56 A. V. C.	12.0	—	—	0	2.5
RCA-55 2nd Det.	0	—	74	8.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-56 A. F. Driver	11.0	—	205	5.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-59 Power	0	—	394	13.0	2.5
RCA-5Z3 Rect.	990–495 R. M. S.			92 Total	5.0

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2730	Resistor—18,000 ohms—Carbon type—1 watt (R24)—Package of 5	$1.10
3024	Capacitor—9 mmfd. (C2)—Package of 2	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt (R8)—Package of 5	1.00
3085	Capacitor—400 mmfd. (C38)	.30
3118	Resistor—100,000 ohms—Carbon type—¼ watt (R5)—Package of 5	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt (R6, R7)—Package of 5	1.00
3435	Resistor—250 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3460	Capacitor—1,200 mmfd. (C31)	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt (R4)—Package of 5	1.00
3527	Resistor—800 ohms—Carbon type—½ watt (R19)—Package of 5	1.00
3529	Socket—Noise suppressor or volume indicator lamp socket	.32
3533	Shutter—High frequency tone control shutter	.50
3534	Shutter—Low frequency tone control shutter	.50
3535	Socket—High or low frequency indicator lamp socket	.32
3548	Knob—High or low frequency tone control knob	.24
3551	Screw assembly—Chassis mounting washer and screw assembly—Comprising 4 screws, 4 lockwashers, 4 washers, 8 cushions and 4 spacers—One set	.68
3556	Capacitor—0.05 mfd.—Located on antenna coil (C3)	.34
3558	Capacitor—50 mmfd. (C19)	.36
3563	Socket—Tuning meter lamp socket and bracket	.32
3564	Bracket—Station selector dial lamp bracket	.25
3565	Socket—Dial lamp socket	.50
3597	Capacitor—0.25 mfd. (C33, C45)	.40
3615	Knob—Range switch knob—Package of 5	.60
3638	Scale—Tuning meter scale—Package of 5	.60
3640	Capacitor—0.05 mfd. (C9, C22, C26)	.25
3641	Capacitor—0.1 mfd. (C7, C13, C23, C25, C27)	.35
3643	Capacitor—0.005 mfd.—Output stage—In series with 18,000 ohm resistor (C39)	.25
3719	Socket—7-contact Radiotron socket	.30
3726	Arm—Range switch operating arm assembly—Comprising arm, link, studs and set screws	.45
3727	Shaft—Shaft and bushing assembly for range switch operating arm—Comprising two washers, shaft, bushing and nut	.30
3747	Capacitor—15 mmfd. (C8)	.36
3749	Capacitor—0.1 mfd.—Tuning meter filter (C40)	.30
3765	Capacitor—0.025 mfd. (C34)	.34
3774	Resistor—7,400 ohms—Tapped at 3,800 and 500 ohms (R25, R26, R27)	.80
3780	Shutter—Noise suppressor shutter	.30
3781	Shutter—Volume control shutter	.30
3782	Shield—Radiotron shield—Second detector	.26
3797	Reactor—Volume control compensating reactor (L15)	.64
3798	Resistor—700 ohms—Carbon type—½ watt (R18)—Package of 5	1.00
3799	Capacitor—80 mmfd. (C30)	.70
3883	Fuse—2 amperes—Package of 5	.40
4013	Capacitor—200 mmfd.—C1	.30
5817	Resistor—20,000 ohms—Carbon type—3 watts (R15, R16)	.25
6186	Resistor—500,000 ohms—Carbon type—Located on antenna coil (R1)—Package of 5	1.00
6192	Spring—3-gang tuning condenser drive cord tension spring—Package of 10	.30
6228	Resistor—200,000 ohms—Carbon type—½ watt (R14)—Package of 5	1.00
6280	Resistor—400,000 ohms—Carbon type—½ watt (R11, R12, R13)—Package of 5	1.00
6281	Resistor—1,100 ohms—Carbon type—½ watt (R23)—Package of 5	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt (R22)—Package of 5	1.00
6288	Knob—Volume control or noise suppressor knob—Package of 5	$1.00
6298	Cord—3-gang tuning condenser drive cord—Package of 5	.60
6300	Socket—4-contact Radiotron socket	.35
6312	Capacitor—650 mmfd. (C15)—Package of 5	1.50
6316	Resistor—2,500 ohms—Carbon type—½ watt (R10)—Package of 5	1.00
6323	Shaft—3-gang variable tuning condenser drive shaft—Comprising 1 shaft, 2 "C" washers and 2 flat washers—Package of 2	.20
6437	Coil—Oscillator coil (L5, L6, L7)	1.24
6447	Volume control complete with mounting nut (R20)	1.92
6448	Tone control—Low frequency tone control complete with mounting nut (R17)	1.04
6449	Tone control—High frequency tone control complete with mounting nut (R21)	1.06
6450	Rheostat—Noise suppressor rheostat (R3)	1.24
6461	Meter—Tuning meter	2.14
6512	Capacitor—0.005 mfd.—High frequency tone control (C37)	.28
6536	Capacitor—3-gang variable tuning condenser assembly	5.00
6537	Switch—Range switch	1.30
6539	Coil—Detector coil (L3, L4)	1.44
6541	Scale—Dial and dial scale	.75
6547	Bezel—Tuning meter bezel	.45
6456	Escutcheon—Volume control escutcheon and color screen	.50
6457	Escutcheon—Noise suppressor escutcheon and color screen	.50
6458	Escutcheon—High and low frequency escutcheon and color screen	.92
6561	Coil—Antenna coil (L1, L2, R1)	1.65
6562	Transformer—Driver transformer (T3)	3.04
6563	Reactor—Volume control series reactor (L16)	1.06
6564	Transformer—First intermediate frequency transformer (C20, C21, C24, L8, L9, R9)	2.30
6565	Transformer—Second intermediate frequency transformer (L10, L11)	2.10
6566	Transformer—Third intermediate frequency transformer (C28, C29, L12, L13)	1.72
6567	Capacitor pack—Comprising one 0.17 mfd. and one 0.7 mfd. capacitors (C35, C36)	.95
6568	Transformer—Interstage audio transformer (T2)	3.10
6571	Capacitor—10.0 mfd. (C43, C44)	1.20
6572	Reactor—Tone control reactor (L14)	.90
6574	Capacitor pack—Comprising two 10.0 mfd. capacitors (C32, C41)	1.80
6578	Reactor—Filter reactor (L18)	3.22
6618	Cable—Braid covered—4-conductor—Reproducer cable	.54
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.	.50
7065	Screw driver—Non-metallic screw driver for oscillator and I. F. adjustments	.80
7439	Drum—Dial drum with set screw and three dial mounting nuts	.35
7484	Socket—5-contact Radiotron socket	.35
7485	Socket—6-contact Radiotron socket	.40
7487	Shield—Radiotron shield	.25
7488	Shield—Radiotron shield top	.20
9028	Transformer—Power transformer—105–125 volts—50–60 cycles (T1)	7.75
9029	Transformer—Power transformer—105–125 volts—25–40 cycles	12.25
9030	Transformer—Power transformer—200–250 volts—50–60 cycles	8.00
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6569	Transformer—Output transformer (T4)	1.95
8920	Ring—Cone retaining ring	.35
8969	Cone—Reproducer cone (L17)—Package of 5	6.35
9031	Coil assembly—Comprising field coil, magnet and cone support (L19)	4.90

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PL 14

RCA Victor Company, Inc.

23544

CAMDEN, NEW JERSEY, U. S. A.

Printed in U. S. A.

Instructions for

RCA Victor 300

Radio-Phonograph Combination (A. C.)
Four-Tube Table Model

INSTALLATION

Preliminary—After unpacking the instrument, remove the base cover (held in place by screws). Refer to the tube location diagram on the rating label inside the cabinet and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the RCA-38, 77 and 78 Radiotrons.

Push both the power cord and antenna lead through the large hole in the base cover and remount the cover. Finally, raise the lid and remove all packing material from the phonograph playing compartment.

Location—The instrument should be placed on a table or other level surface near an electrical outlet or lamp socket. Care must be taken to avoid restriction of natural ventilation as would occur with the set resting upon a soft cloth pad or situated so that the back of the cabinet is flush with a wall of the room. To prevent damage to the cabinet finish and possibly more serious internal injury, the instrument should not be placed upon or close to a radiator or other heating device.

Antenna Connections—The most satisfactory length of antenna for use with the receiver should be determined by trial in each installation. In general, it is advisable always to use the shortest length which provides the desired signal pickup. The attached antenna lead is approximately 20 feet in length and in itself will provide sufficient local pickup (when fully uncoiled) in the majority of installations. In many cases, improved selectivity will be obtained by recoiling a portion of the lead but the coil must be allowed to remain outside of the cabinet.

Improved pickup for distant reception may be obtained by connecting the end of the antenna lead to a piping system (water, gas or heating), to a large-area conducting surface or to an external antenna system of from 25 to 75 feet in length. If the receiver is to be installed in a building of metallic construction, the antenna lead ordinarily will have to be dropped out of the nearest window, since such structures form an effective shield which greatly impedes the passage of radio waves.

Power Supply—Connect the power cord to the electrical outlet, making certain first, however, that the voltage and frequency (cycles) of the alternating-current power supply correspond to the nominal rating of the instrument as indicated on the rating label. *Do not operate this instrument from any power supply circuit on which is impressed a voltage exceeding 125 volts.*

CAUTION: **DISCONNECT INSTRUMENT FROM POWER SUPPLY BEFORE TOUCHING CHASSIS, TUBES OR METAL PARTS INSIDE CABINET.**

OPERATION

The instrument has three operating controls, two located upon the front panel of the cabinet, and one contained in the phonograph playing compartment. These controls perform the following functions:

(1) *Station Selector (Left-hand knob on front panel)*—The pointer of this knob passes over an escutcheon marked in equally-spaced divisions (0–100) covering the complete tuning range (540–1712 kilocycles). Stations in the standardized broadcast band (540–1500 kilocycles) will be received between the dial settings "100" and "10," approximately. *Police calls* transmitted at 1554, 1575, 1596, 1662 and 1712 kilocycles will be received at settings near the "0" end of the scale.

(2) *Radio Volume Control and Power Switch (Right-hand knob on front panel)*—In the extreme counter-clockwise position, the power switch is *off*. A slight clockwise twist of the knob turns on the power and further rotation serves to increase the volume on radio reception.

(3) *Record Volume Control (Knob in phonograph playing compartment)*—The volume produced by a phonograph record will be increased upon rotation of this knob in a clockwise direction. When not operating the phonograph, this control should be turned fully counter-clockwise in order to insure proper radio performance.

RADIO RECEPTION

To operate the radio receiver, proceed as follows:

1. Apply power to the receiver by turning the right-hand knob on the front panel clockwise from the "off" position of the switch. A definite "snap" should be heard at first; continue rotation of the knob to the opposite extremity of this control.

2. Allow a minute or two for the Radiotron filaments to heat and make certain that the record volume control (in playing compartment) is turned fully counter-clockwise. Then proceed to rotate the station selector slowly until a signal is heard.

3. Upon receiving a desirable signal, reduce the volume level if necessary and then adjust the station selector (for best reproduction) to a position midway between the points where the signal disappears.

NOTE 1—When tuned to a strong local station with the radio volume control fully advanced, a condition may be observed where a certain amount of counter-clockwise rotation of that control will improve the quality of reproduction and actually increase the volume. This condition is caused by "overloading" and may be corrected simply by setting the radio volume control below the readily-apparent critical point.

NOTE 2—If the antenna lead is bunched or coiled too near the set, oscillation (indicated by "whistling" on stations) may occur. This condition also may be corrected by reducing the radio volume control setting. When operated at or near the point of oscillation, however, the sensitivity of the set will be greatly increased—ordinarily to a point in excess of that required for normal reception.

4. When through operating, turn off the power by rotating the radio volume control counter-clockwise until the "snap" of the power switch is heard.

PHONOGRAPH REPRODUCTION

Facilities for electrical reproduction of standard-speed (78 revolutions per minute) phonograph records are contained in this instrument. To play records of this type, swing back the hinged lid of the cabinet (remove the lid, if desired, by sliding from its hinges) and proceed as follows:

1. Turn the power *on*, as for radio reception, by a slight clockwise rotation of the right-hand knob on the front panel. To prevent radio interference, this knob should not be turned beyond that point at which the "click" of the power switch is heard. If the receiver is tuned to a local or strong station, it may be found necessary to rotate the station selector a slight amount to eliminate such interference.

2. Place the record upon the turntable and insert a *new* needle—*Chromium* (orange or green shank), *Tungstone* (full volume) or *steel* (full volume)—in the electric pickup. To insert the needle, first loosen the knurled screw on the front of the pickup, push the needle to the full depth of the opening and tighten the screw.

NOTE—Do not play more than one recording with a steel needle. With care, the *orange* Chromium needles may be used to play 25, and the *green* Chromium needles from 75 to 100 recordings. Chromium needles should never be replaced in the pickup (if removed for any reason before completely worn) as undue record wear would result. Tungstone needles are capable of playing from 100 to 200 recordings, provided care is taken not to injure the point. Do not use *Tungstone* needles on thin, flexible records or on transparent-faced (illustrated) records.

3. Start the turntable rotating in a *clockwise* direction by a quick twirl with the hand. Then lower the pickup carefully on the record, starting the needle at the outside groove.

4. Adjust the record volume control to obtain the desired volume.

5. Upon completion of the selection, lift the pickup and swing it to the right so as to clear the turntable. While changing records, the turntable either may be left rotating or may be stopped by pressure of the hand as found most convenient.

6. When through operating return the record volume control to its counter-clockwise extremity. The pickup should be placed upon the rubber rest at the right-hand side of the turntable when not operating the phonograph—do not leave the pickup resting on the record or turntable. Replace the cabinet lid.

Lubrication—Lift off the turntable at least once each year and apply a few drops of high-grade light machine oil around the *outside* of the shaft bushing, to provide lubrication for the metal washer upon which the motor field member floats. The shaft bushing is self-lubricating; however, no harm will result if excess oil runs inside the bushing.

SERVICE DATA

Electrical Specifications

Voltage Rating............................105–115 Volts
Frequency Rating..................25, 50, and 60 Cycles
Power Consumption............................55 Watts
Tuning Range............................540–1710 K. C.
Type and number of Radiotrons
1 RCA-78, 1 RCA-77, 1 RCA-38, 1 RCA-25Z5—Total, 4
Undistorted Output................0.3 Watts at 60 Cycles

This table type combination instrument consists of a four tube tuned R. F. receiver and a new compactly constructed motor board assembly. It is designed for A. C. operation only. Features such as wide tuning range, electro-dynamic loudspeaker, ability to play both 10 and 12 inch records and excellent quality of reproduction characterize this instrument. Figures C and D show the schematic and wiring diagrams respectively while the voltage readings and replacement parts are given below:

RADIOTRON SOCKET VOLTAGES

Measured at Maximum Volume—115 Volts, 60 Cycles

Radiotron No.	Cathode to Control Grid, Volts D.C.	Cathode to Screen Grid, Volts D.C	Cathode to Plate, Volts D.C.	Plate Current M. A.	Filament or Heater Volts
RCA-78, R. F.	2.5	100	200	8.0	6.0
RCA-77, Detector	*5.0	95	*100	0.2	6.0
RCA-38, Output	18.0	180	170	14.0	6.0
RCA-25Z5, Rectifier	—	—	115	30.0	25.0

*** Impossible to measure on ordinary voltmeter.**
NOTE: 25 cycle voltages will be less than those obtained on 60 cycles.

Pickup Service Data

The magnetic pickup and tone-arm assembly of this instrument is of new design and unique construction. Service work will consist of centering the armature, replacing the rubber pivots and replacing the magnet coil.

Disassembling the Pickup

The pickup may be disassembled in the following manner:

(a) Unsolder the two cable connections to the terminal strip.

(b) Remove the needle screw and screws "A" and "B."

(c) Remove the pickup assembly from the arm and housing.

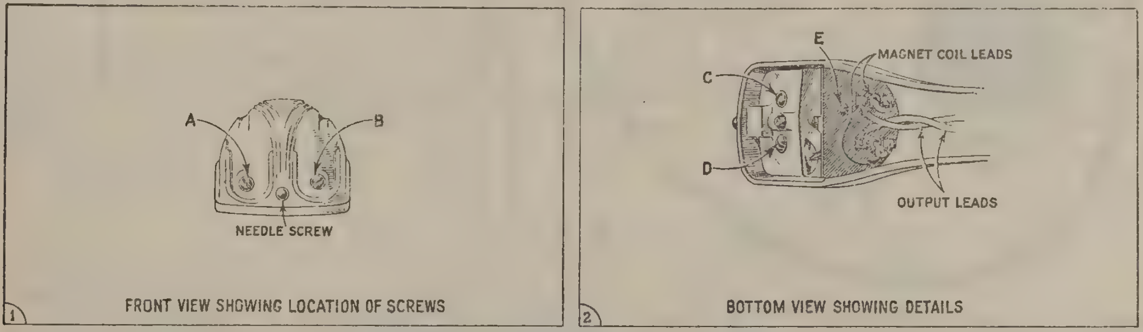
(d) Unsolder the two magnet coil leads attached to the terminals and then remove screw E. This will allow the removal of the fibre terminal board.

(e) If centering of the armature is the only adjustment required, such centering can be done without further disassembly. The armature is centered by loosening screw F and holding the armature with the finger in proper position while screw F is tightened. A visual inspection is sufficiently accurate for centering. When centering after any work has been done or the magnet removed, it is important that the magnet be remagnetized while in place.

(f) If the coil or pivot rubbers are to be replaced, the pickup must be further disassembled. This is done by first removing the magnet and then removing screws C and D. The pole piece is now removed, paper sleeve pushed out and the magnet coil slipped from between the pole pieces. Be careful to replace the paper sleeve that centers the coil and to replace it in the new coil assembly.

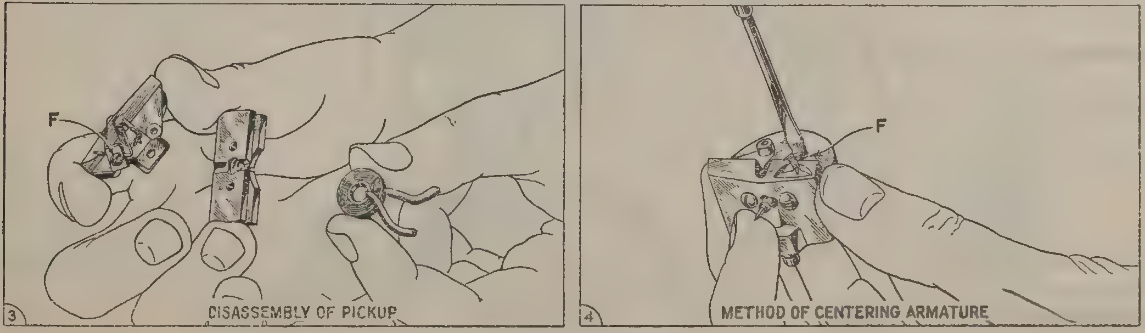
(g) The pivot rubbers are replaced by loosening the armature adjusting screw F and removing the armature from its bracket. The rubbers can then be removed by slipping them from each end of the pivot shaft.

It is important to remember that in all operations after reassembling, but before placing in the tone arm, the pickup should be magnetized and the armature centered after remagnetizing. Magnetizing should be done by placing the pickup magnet on the magnetizer and sliding it onto the pole pieces, after magnetizing being careful not to break the magnetic circuit.



FRONT VIEW SHOWING LOCATION OF SCREWS

BOTTOM VIEW SHOWING DETAILS



DISASSEMBLY OF PICKUP

METHOD OF CENTERING ARMATURE

Figure A—Pickup Details

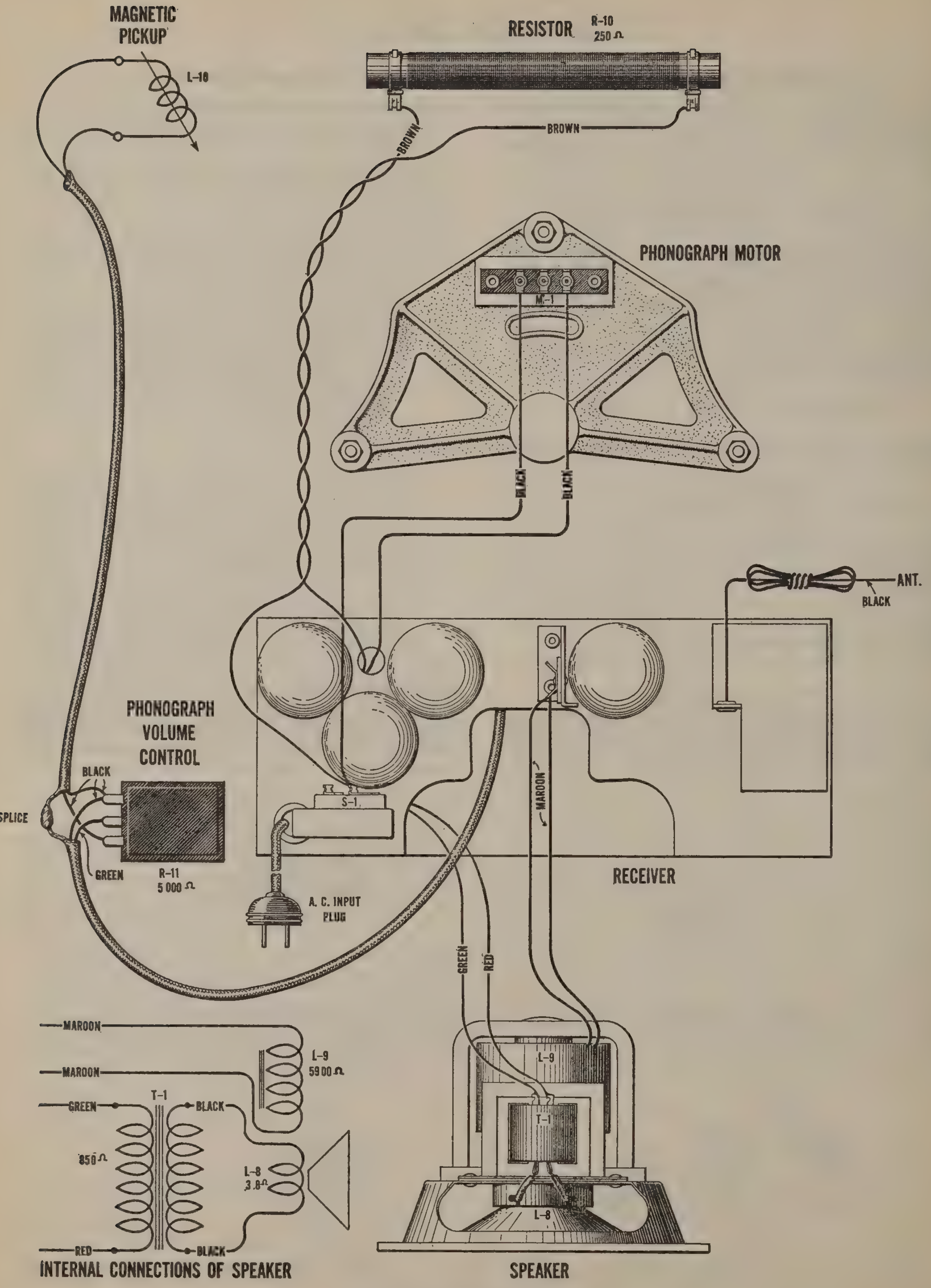


Figure B—Assembly Wiring

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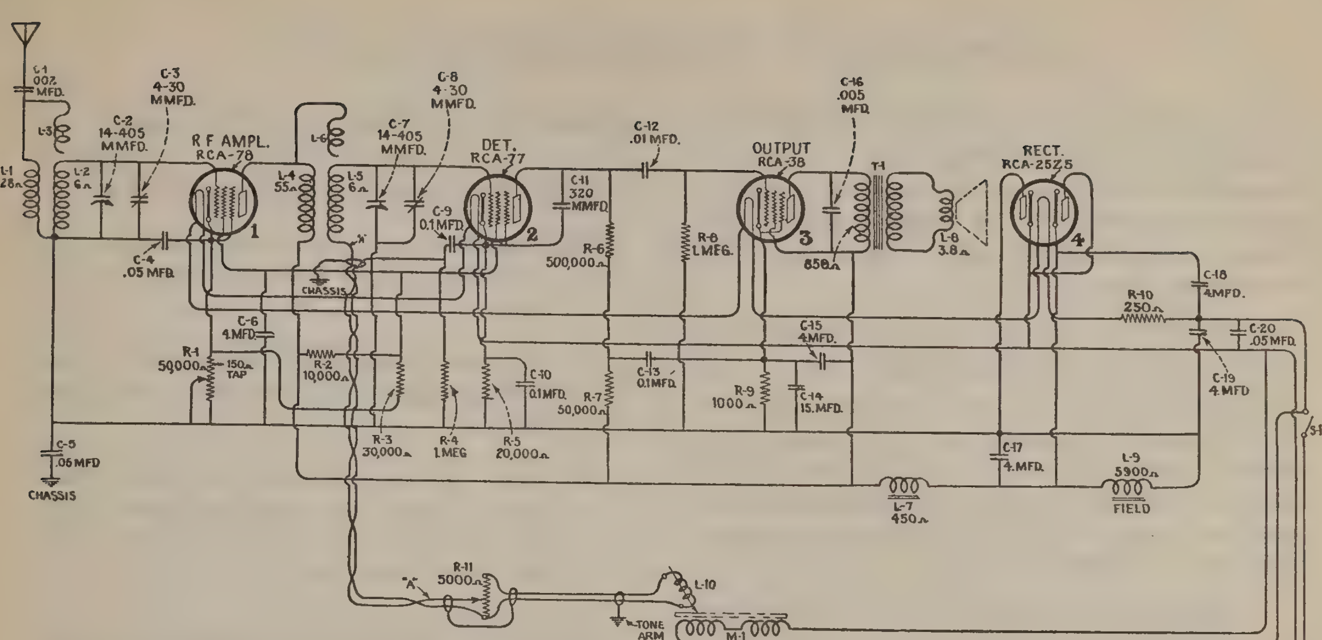

Figure C—Schematic Wiring Diagram

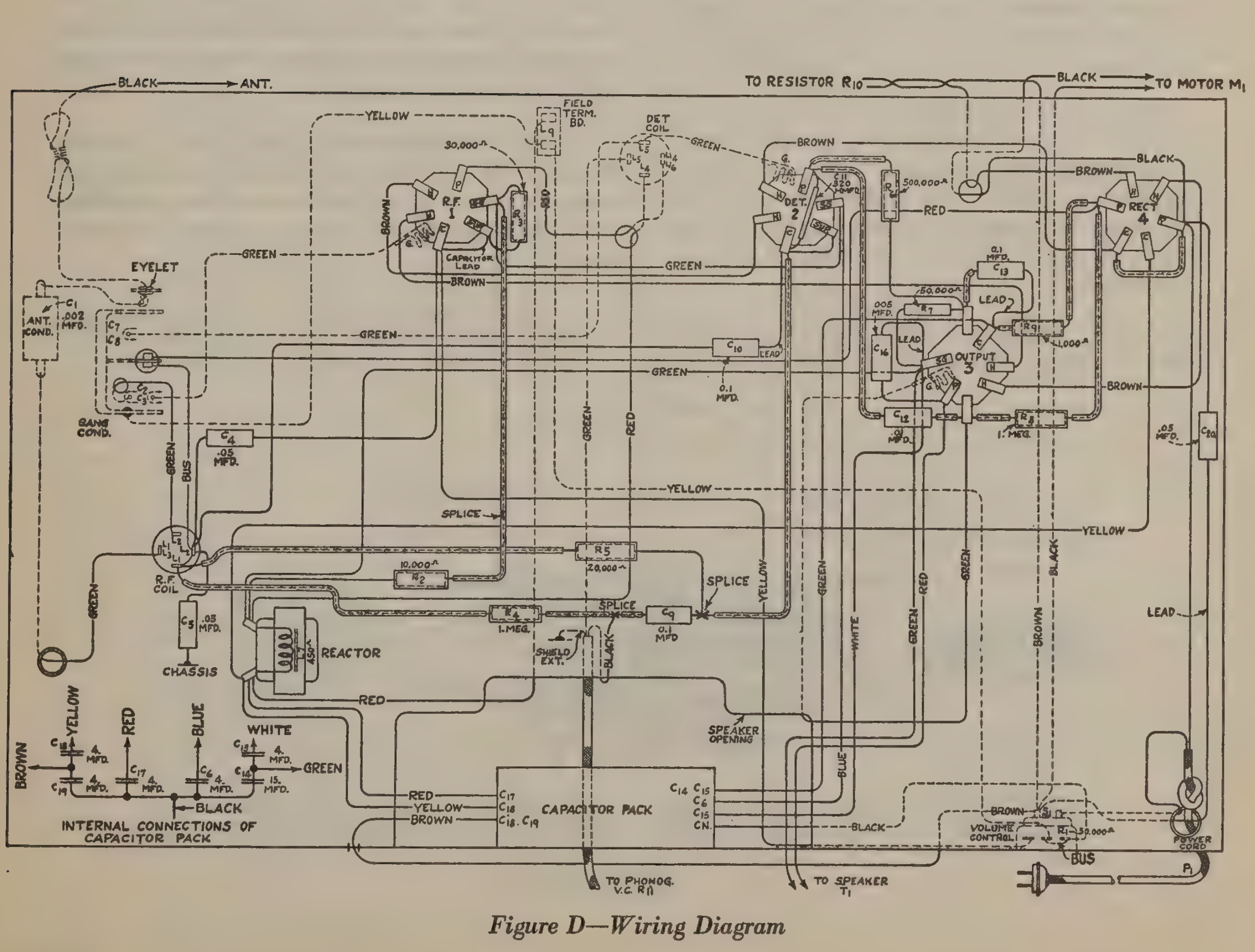

Figure D—Wiring Diagram

PHONOGRAPH MOTOR SERVICE DATA

The synchronous motor used in this instrument is of simple design and foolproof construction. Among its many features are low power consumption, single moving part, ease of starting, oilless main bearing, resilient bumper, and long life with freedom from service repairs.

Figure E shows the main parts of the motor and the points that may require attention.

Operation—The two stator coils are connected in series and the motor is started by giving it a clockwise spin with the hand. If it is found to be difficult of starting, or if it runs at a sub-synchronous speed such as at 70 R. P. M., such action may result from one of the following causes:

> *Difficult to Start*—This may be due to the stator failing to rotate on the outer bearing. This can be caused by the spaghetti sleeve being jammed in the slot, or sticking to the resilient bumper. The outer bearing not being properly lubricated may also cause this condition. It is important that the ball bearing be at the bottom of the main bearing assembly.
>
> *Slow Speed*—If the turntable is jarred or slowed down, the motor may run at a sub-synchronous speed, such as 70 R. P. M. This is remedied by merely lifting the tone arm from the turntable, thereby removing the load. The turntable speed will then immediately increase to normal.

Excessive Vibration and Hum—A small amount of hum when starting decreasing to a negligible amount while running is normal. If excessive vibration occurs either at starting or running, it may be due to one of the following:

(1) Insufficient lubricant in outer bearing or any other failure that will cause the stator to bind.

(2) The metal washer should be above the leather washer at the bottom of the main bearing.

(3) Motor not properly supported from motor board. Unless the motor is properly supported from the motor board, normal vibration will be excessive.

Removing Rotor from Stator—The rotor which includes the turntable may be removed by loosening the screw shown in Figure E until it clears the rotor and then lifting the turntable. Be careful not to lose the ball end-bearing when this is removed. After replacing the rotor, tighten the restraining screw securely to eliminate the possibility of rattle in operation.

Power Consumption—The motor consumes 4 watts. It should never be turned on when the rotor is removed, as in this condition excessive current will be drawn with consequent increase in temperature.

NOTE: **The above values of power consumption are average for a 60 cycle motor at 125 volts. At lower voltages the power consumption will be less.**

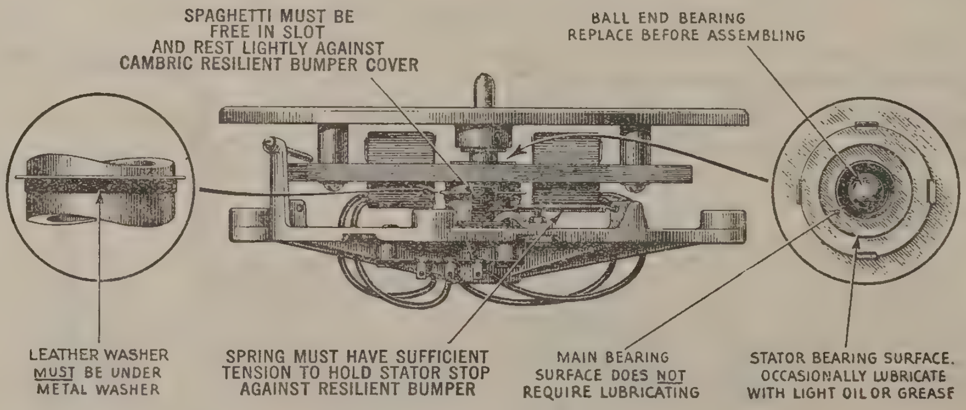
SPAGHETTI MUST BE FREE IN SLOT AND REST LIGHTLY AGAINST CAMBRIC RESILIENT BUMPER COVER
BALL END BEARING REPLACE BEFORE ASSEMBLING
LEATHER WASHER MUST BE UNDER METAL WASHER
SPRING MUST HAVE SUFFICIENT TENSION TO HOLD STATOR STOP AGAINST RESILIENT BUMPER
MAIN BEARING SURFACE DOES NOT REQUIRE LUBRICATING
STATOR BEARING SURFACE. OCCASIONALLY LUBRICATE WITH LIGHT OIL OR GREASE

Figure E—Details of Motor

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2816	Resistor — 1,000 ohms — Carbon type — ½ watt (R9)—Package of 5	$1.00
2981	Capacitor—320 mmfd. (C11)	.30
3048	Resistor—500,000 ohms—Carbon type—½ watt (R6)—Package of 5	1.00
3076	Resistor — 1 megohm — Carbon type — ½ watt (R4, R8)—Package of 5	1.00
3077	Resistor—30,000 ohms—Carbon type—½ watt (R3)—Package of 5	1.00
3078	Resistor—10,000 ohms—Carbon type—½ watt (R2)—Package of 5	1.00
3556	Capacitor—0.05 mfd. (C4, C5)	.34
3569	Knob—Station selector or volume control knob—Package of 5	.65
3594	Resistor—50,000 ohms—Carbon type—½ watt (R7)—Package of 5	1.00
3615	Knob—Phonograph volume control knob—Package of 5	.60
3460	Capacitor—0.05 mfd. (C20)	.25
3641	Capacitor—0.1 mfd. (C9, C10, C13)	.35
3697	Escutcheon—Station selector escutcheon—Package of 2	.28
3698	Escutcheon—Volume control escutcheon—Package of 2	.28
3701	Capacitor—0.01 mfd. (C12)	.30
3724	Reactor—Filter reactor (L7)	1.10
3806	Resistor — 250 ohms — Wire wound — Porcelain type—Filament resistor (R10)	.40
3807	Screw—Chassis mounting screw and washer —Package of 10	.46
4007	Capacitor—0.0024 mfd. (C1)	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt (R5)—Package of 5	1.00
6512	Capacitor—0.005 mfd. (C16)	.28
6585	Condenser—Two gang variable tuning condenser	2.20
6586	Volume control—Radio volume control (R1)	1.20
6587	Capacitor—Comprising five 4.0 mfd. and one 15.0 mfd. capacitors (C6, C14, C15, C17, C18, C19)	2.42
6588	Coil—R. F. coil assembly (L1, L2, L3)	.70
6589	Coil—Detector coil (L4, L5)	.80
6590	Volume control—Phonograph volume control (R11)	1.20
7484	Socket—Radiotron five contact socket	$0.35
7458	Socket—Radiotron six contact socket	.40
	PICKUP AND ARM ASSEMBLIES	
3810	Coil—Pickup coil (L10)	.32
3811	Screw—Needle holding screw—Package of 10	.46
3812	Armature	.32
6592	Pickup and arm assembly complete	3.36
	TURNTABLE AND MOTOR ASSEMBLIES	
3808	Board—Motor terminal board	.20
3809	Spring—Package of 5	.24
3813	Motor suspension assembly—Comprising one screw, one metal bushing, two rubber bushings, one flat washer, one lockwasher and one nut—3 sets	.56
4052	Spring—Stator tension spring—Package of 5	.40
4123	Damper—Motor damping block—Package of 5	.50
7651	Coil—Stator coil—60 cycle operation	.48
7652	Coil—Stator coil—50 cycle operation	.48
7653	Lamination—Stator laminations—Assembled —60 cycle operation	.66
7654	Lamination—Stator laminations—Assembled —50 cycle operation	.66
7655	Lamination—Rotor lamination assembly—60 cycle operation	1.00
7656	Lamination—Rotor lamination assembly—50 cycle operation	1.00
7657	Base—Motor base and bearing assembly	1.20
9038	Motor complete—105–125 volts—60 cycles	4.20
9039	Motor complete—105–125 volts—50 cycles	4.20
9040	Turntable complete—With spindle for 50 or 60 cycle operation	1.16
10194	Ball—Steel ball bearing—Package of 20	.25
	REPRODUCER ASSEMBLIES	
6591	Transformer—Output transformer	1.22
8987	Cone—Reproducer cone complete (L8)—Package of 5	5.00
9037	Coil assembly—Comprising field coil, magnet and cone support (L9)	2.78
9044	Reproducer complete	5.00

RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

.23553

Printed in U. S. A.

Instructions for

RCA Victor 310

Five-Tube, Double-Range Superheterodyne

Radio-Phonograph Console

INSTALLATION

Location—The instrument should be placed convenient to the antenna and ground connections and to an electrical outlet.

Phonograph—Remove the packing material from the phonograph compartment. With the speed shifter (lever projecting beneath turntable at front left-hand corner) set in the outward (78 R. P. M.) position, mount the turntable (packed in outfit package) on the motor spindle. Make sure that the drive pin engages the slot in the turntable hub. Insert the used-needle cup (also in outfit package) in the opening provided.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connection to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the rating label at the rear of the receiver chassis.

Radiotrons—The instrument is equipped and tested at the factory with RCA Radiotrons and is shipped with the tubes in the sockets. The set is therefore ready to operate when it is removed from the carton and external connections are made as described in the foregoing.

If, when first installed, the receiver does not operate or performs imperfectly, one or more of the tubes, shields or dome terminal leads may have been jarred loose in shipment. Remove the back cover of the cabinet and refer to the tube location diagram on the rating label. *Make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the spring connectors at the ends of the short flexible leads are securely attached to the dome terminals of the proper Radiotrons as indicated on the diagram.

OPERATION

CONTROLS

The instrument has five operating controls, four of which are located on the front panel of the cabinet, as follows:

(1) *Radio Volume Control* (*Combined with Power Switch*) (Left-hand Knob)—This control is provided with an illuminated dial. In the extreme counter-clockwise position the power switch is "off." Rotating the knob slightly clockwise turns on the power—further rotation increases the volume.

(2) *Tone Control* (Middle Knob)—The extreme clockwise position gives full range reproduction. When the knob is turned counter-clockwise, high-frequency (treble) response is decreased.

(3) *Station Selector* (Right-hand Knob—Symmetrical with Radio Volume Control)—This control is equipped with an illuminated dial, calibrated to facilitate location and identification of stations (add one cipher to scale numerals to obtain frequency in kilocycles).

(4) *Frequency Range Switch* (Below and to Right of Station Selector)—With this knob in the *counter-clockwise* position, broadcasting stations in the 540–1500 kilocycle range will be received (frequencies in this range are indicated by the large numerals adjacent to the scale graduations). With the knob in the *clockwise* position, stations operating in the 1400–2800 kilocycle range will be received (frequencies in this range are indicated approximately by the small numerals at the top of the dial), as follows:

(a) **Police Calls**—At dial settings near "80" for stations transmitting at 1712 kilocycles, and at "118–122" for stations operating in the 2450 kilocycle band.

(b) **Amateur Radio "Phone"**—At dial settings "90–95" (assigned band 1900–2000 kilocycles).

(c) **Aviation Reports, Airport Beacons, Etc.**—At dial settings "95–118" (assigned band 2000–2400 kilocycles).

(d) **Amateur Radio "CW" (Code)**—At dial settings "80–90" (assigned band 1715–1900 kilocycles). Signals of this class are normally unintelligible or inaudible with this type of receiver.

The fifth control is located in the phonograph compartment, at the right-hand front corner of the motor board, namely:

(5) *Record Volume Control* (*Combined with Radio-Record Switch*)—For radio operation, this control must be set in the extreme counter-clockwise position. A slight clockwise rotation transfers the switch for phonograph operation—further rotation increases the volume on records.

RADIO OPERATION

To operate the receiver, proceed as follows:

1. Set the radio-record transfer switch for "Radio" by turning the Record Volume Control to the extreme counter-clockwise position.

2. Set the Frequency Range Switch for the desired frequency band—see paragraph (4) under "CONTROLS."

3. Turn on the power and set the Radio Volume Control fully clockwise for maximum volume—reduce the setting if too noisy after allowing approximately one-half minute for the tubes to heat.

4. Turn the Station Selector slowly over the range of the dial until a desirable station program is heard.

> NOTE—The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

5. Accurate tuning for *best* reproduction is accomplished as follows:

(a) Turn the Radio Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position mid-way between the points where the quality becomes poor or the signal disappears.

(c) Adjust the Volume Control to obtain the desired sound level.

6. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

7. When through operating, turn the Radio Volume Control knob fully counter-clockwise until the "off" click of the power switch is heard.

PHONOGRAPH OPERATION

Electric phonograph facilities are provided in this instrument for playing either standard (78 R. P. M.) records or long playing (33⅓ R. P. M.) records. Proceed as follows:

1. Turn the Record Volume Control clockwise for record reproduction and set this control near the middle of its range.

2. Apply power by turning the Radio Volume Control knob slightly clockwise. Several seconds will be required for the Radiotrons to heat before reproduction is possible.

3. Place a record on the turntable. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle, or if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle. Ordinary steel needles (full volume or full tone) can also be used on 78 R. P. M. records, provided a new needle is inserted for each selection.

> NOTE—With care, the orange Chromium needle should play 25, the green Chromium 75 to 100, and the Tungstone 100 to 200 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly), as damage to the record grooves would result.* Do not use *Tungstone* needles with thin flexible records or with transparent-faced (illustrated) records.

4. Pull the starting lever (right-hand side of turntable) forward to start the turntable. Set the speed shifter (left-hand side of turntable) for the speed (78 or 33⅓ R. P. M.) corresponding to the record on the turntable. Then place the needle on the smooth outer surface of the record and slide it into the first groove.

5. Adjust the Record Volume Control to obtain the desired volume.

6. For most faithful reproduction, the Tone Control should be left in the fully clockwise position while using the phonograph. Turning this control counter-clockwise decreases the treble response and reduces the needle scratch noise—particularly noticeable on old records—reproduced by the loudspeaker.

7. When the record has been played, lift the pickup and move it to the right so as to clear the turntable, thereby stopping the motor. (When through playing an eccentric groove record the motor will stop automatically.)

8. When through operating, switch off the power by turning the Radio Volume Control knob to the extreme counter-clockwise position. The pickup should never be left with the needle resting on the record (or turntable) when not operating the phonograph.

Lubrication—The motor should be lubricated with light oil once every six months. Two oil holes on top of the motor are accessible when the turntable is removed. The ball bearing mechanism under the turntable should be lubricated once a year by prying off the cover and packing with vaseline or light motor grease, being careful to prevent any dirt particles from entering with the grease. Make sure that the speed shifter is in the outward (78 R. P. M.) position before replacing the turntable on the spindle.

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating....................25, 50 and 60 Cycles
Power Consumption..................60 Cycles, 95 Watts
Number and Types of Radiotrons..............1 UX-280,
1 RCA-2A5, 1 RCA-58, 1 RCA-57, 1 RCA-2A7—Total, 5
Undistorted Output...........................1.75 Watts
Frequency Range.................540 K. C. to 1500 K. C.
and 1400 K. C. to 2800 K. C.

This combination radio-phonograph instrument uses a five-tube Super-Heterodyne receiver incorporating a dynamic loudspeaker, continuously variable tone control, single heater type Pentode output tube and the inherent sensitivity, selectivity and tone quality of the Super-Heterodyne.

The standard two speed motor board equipment is used and the entire assembly enclosed in a table type cabinet.

A special feature is the Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure B shows the assembly wiring, Figure C the schematic diagram and Figure D the chassis wiring diagram. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage consisting of a transformer using two tuned circuits, a second detector, an output tube and a rectifier.

Line-up Capacitor Adjustment

The line-up capacitor adjustments for the I. F. stage and the gang capacitors are made in the following manner:

(a) Procure a modulated oscillator giving a signal at 175 K. C., 600 K. C., 1400 K. C., and 2440 K. C. An output meter and non-metallic screw driver are also necessary.

(b) The I. F. line-up capacitors should be first adjusted. This is done by placing the oscillator in operation at 175 K. C., coupling its output between the control grid and ground of the first detector, connecting the output meter across the cone coil of the loudspeaker and adjusting the two I. F. line-up capacitors until maximum output is obtained.

(c) After the I. F. circuits are aligned, the broadcast band R. F. is adjusted at 1400 K. C. This is done with the Range Switch at the broadcast position. A similar manner is used as that of the I. F., except that the oscillator is set at 1400 K. C., its output is connected from antenna to ground of the receiver, and the dial is set at 140. The adjustment is made with the trimming capacitors located on top of the gang capacitor and each capacitor is adjusted for maximum output.

(d) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, located at the bottom of the chassis, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment as the tuning capacitor and oscillator series capacitor adjustments interlock.

(e) Change the frequency of the oscillator to 1400 K. C. and set the dial at 140. Again make the adjustments given under (c).

(f) The high frequency band is adjusted at 2440 K. C. This is done in a similar manner to the R. F. adjustments except that the oscillator is set at 2440 K. C., the dial at 120 and the Range Switch in the high frequency position. The line-up capacitors on the selector switch are adjusted for maximum output at this frequency.

Service data for the magnetic pickup is included below.

RADIOTRON SOCKET VOLTAGES
115 Volt A. C. Line
MAXIMUM VOLUME CONTROL SETTING—NO SIGNAL

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
1. RCA-58 R. F. Amplifier	3.0	95	250	5.0	2.33
2. RCA-2A7 First Detector Oscillator	3.0	95	250	3.0	2.33
3. RCA-57 Second Detector	6.0	89	170	0.3	2.33
4. RCA-2A5 Power Amplifier	18.0	235	220	32.0	2.33
5. RCA-80 Rectifier	275 Volts PLATE TO PLATE—60 M. A. TOTAL				4.82
TOTAL CATHODE CURRENT—11 M. A.					

SERVICE DATA ON MAGNETIC PICKUP

This magnetic pickup is of a new design that results in excellent reproduction. While in physical appearance, it is similar to that of the older type, details of construction are considerably different. It consists of essentially a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature.

REPLACING MAGNET COIL, PIVOT RUBBERS, OR ARMATURE

In order to replace a defective magnet coil or hardened pivot rubbers, it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws.

(d) Remove screws A and B, Figure A, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered.

(f) The mechanism should now be reassembled except for the magnet which must be magnetized. After being magnetized the mechanism—with the pole pieces upward, should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change polarity.

(g) After reassembling to the mechanism, the entire assembly should be fastened to the back plate by means of the two screws provided, making sure support is down against pads on back. At the same time, the metal dust cover must be placed in position.

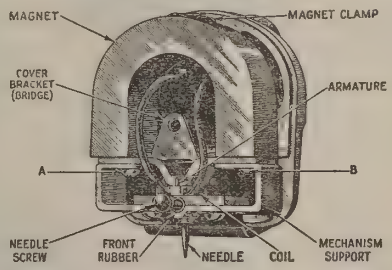

Figure A—View of Pickup showing parts

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure A), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

Only rosin core solder should be used for any soldering in conjunction with the pickup. However, if great care to wipe clean and use as small amount as possible is exercised, paste or liquid flux may be used for soldering the end of the spring.

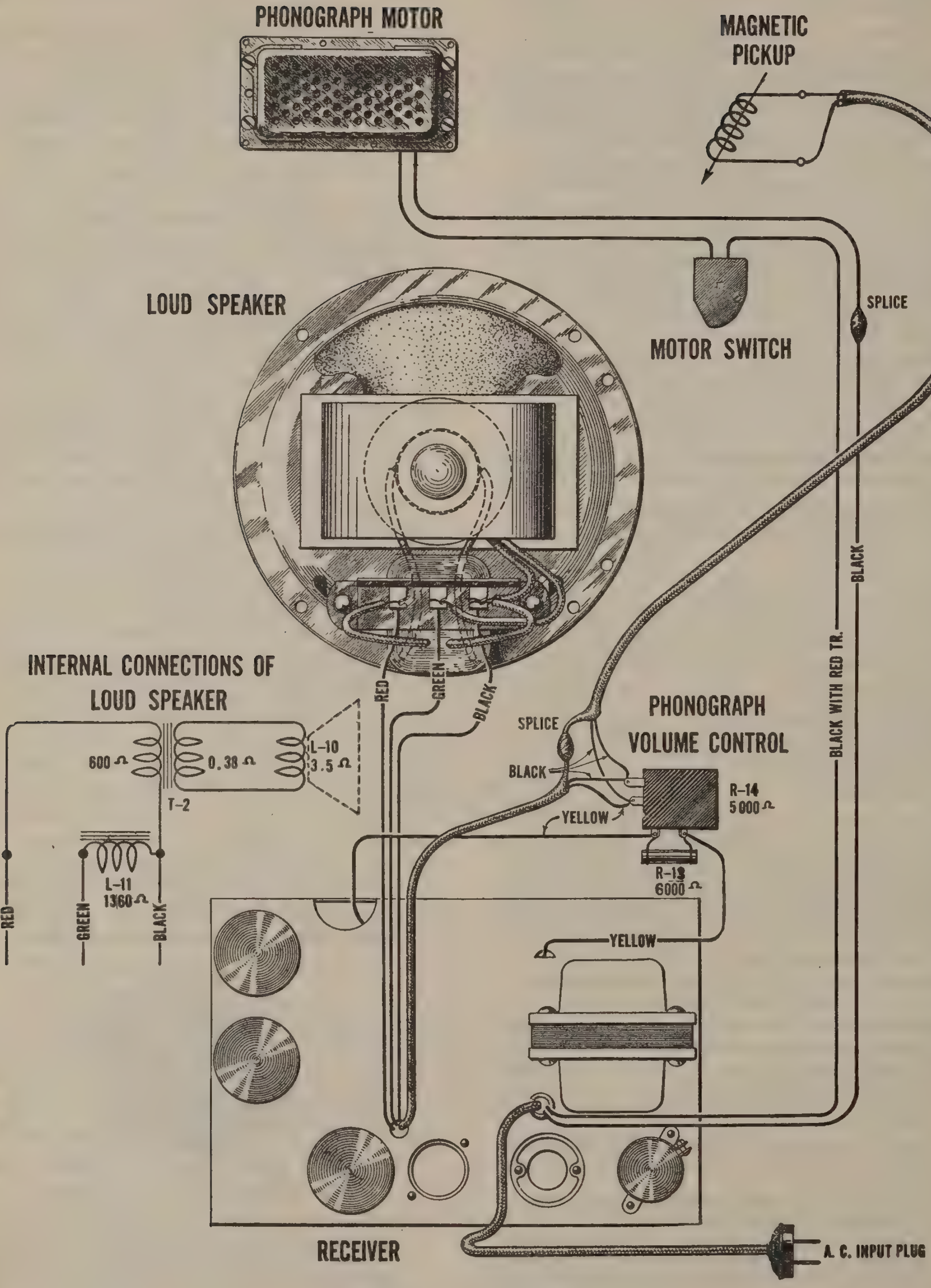

Figure B—Assembly Wiring

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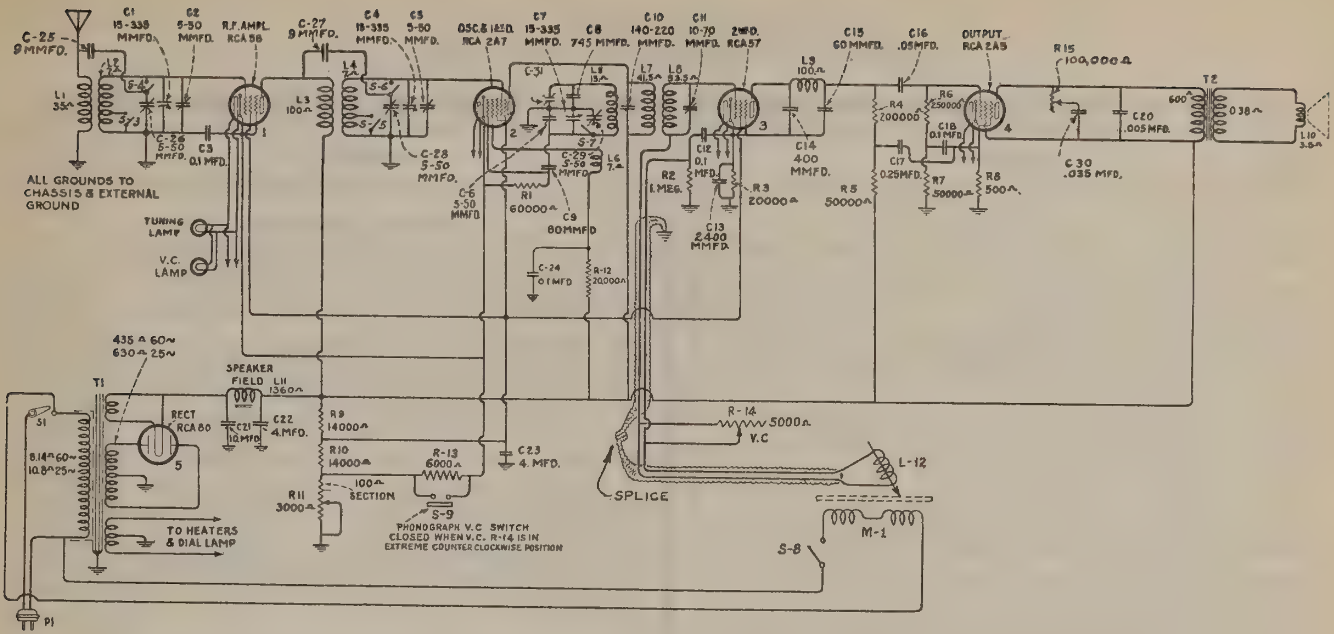

Figure C—Schematic Circuit Diagram—Note: R-11 may be either 3000 ohms or 4500 ohms

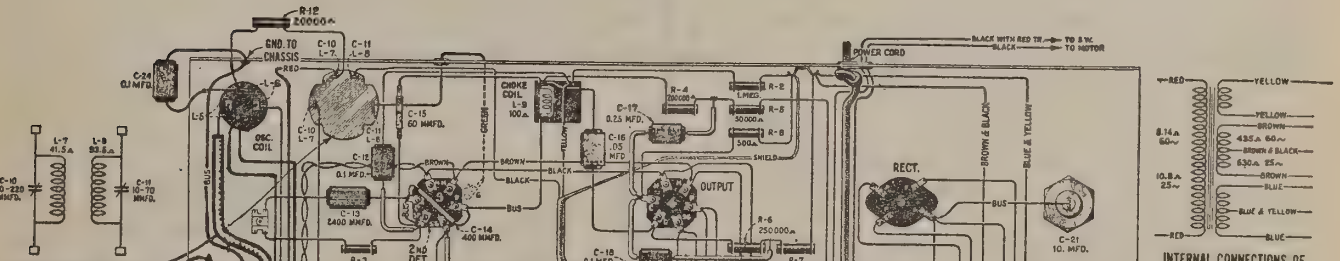

Figure D—Wiring Diagram—C-31 is 15–70 mmfd.

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2563	Resistor—6,000 ohms—Carbon type—1 watt—Pkg. of 5 (R13)	$1.10
2734	Capacitor—745 mmfd. (C8)—Package of 5	1.50
2747	Contact cap—Package of 5	.50
2994	Coil—R. F. choke coil (L9)	.45
3050	Resistor—14,000 ohms—Carbon type—3 watts (R9)	.25
3076	Resistor—1 megohm—Carbon type—½ watt—Pkg. of 5 (R2)	1.00
3459	Capacitor—80 mmfd. (C9)	.44
3472	Capacitor—0.0024 mfd. (C13)	.32
3514	Resistor—250,000 ohms—Carbon type—½ watt—Pkg. of 5 (R6)	1.00
3555	Capacitor—0.1 mfd. (C24)	.36
3572	Socket—Radiotron 7 contact socket	.38
3573	Socket—Radiotron 4 contact socket	.32
3584	Ring—R. F. or oscillator coil retaining ring—Pkg. of 5	.40
3592	Knob—Station selector, volume or tone control knob—Package of 5	.80
3594	Resistor—50,000 ohms—Carbon type—½ watt—Pkg. of 5 (R5, R7)	1.00
3596	Capacitor—60 mmfd. (C15)	.36
3597	Capacitor—0.25 mfd. (C17)	.40
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Pkg. of 5 (R1)	1.00
3604	Capacitor—400 mmfd. (C14)	.30
3623	Shield—R. F. or oscillator coil shield	.30
3624	Socket—Dial lamp socket and bracket	.40
3625	Indicator—Volume control indicator	.40
3632	Resistor—500 ohms—Carbon type—1 watt—Pkg. of 5 (R8)	1.10
3641	Capacitor—0.1 mfd. (C3, C12, C18)	.35
3713	Capacitor—0.05 mfd. (C16)	.32
3783	Capacitor—9 mmfd.—Package of 2 (C25, C27)	.50
3785	Screw—Chassis mounting screw—Package of 10	.40
6228	Resistor—200,000 ohms—Carbon type—½ watt—Pkg. of 5 (R4)	1.00
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkg. of 5 (R3, R12)	1.00
6306	Resistor—14,000 ohms—Carbon type—1 watt—Pkg. of 5 (R10)	1.10
6464	Transformer—I. F. transformer (C10, C11, L7, L8)	1.88
6471	Coil—Oscillator coil assembly (L5, L6)	.74
6527	Coil—Antenna coil (L1, L2)	1.08
6528	Coil—R. F. coil assembly (L3, L4)	.94
6573	Switch—Range switch	1.25
6598	Capacitor—Three gang variable tuning capacitor	3.00
6599	Volume control—Complete with mounting nut (R11)	1.25
6620	Capacitor—Comprising one 0.005 and one 0.035 mfd. capacitors (C20, C30)	.50
6622	Dial—Station selector dial assembly	.95
6645	Tone control (R15)	1.20
7062	Capacitor—Adjustable—15–70 mmfd.	.50
7063	Capacitor—Adjustable—5–40 mmfd. (C31)	.50
7485	Socket—Radiotron 6-contact socket	.40
7589	Capacitor—Filter capacitor—Two 4.0 mfd. in container (C22, C23)	1.64
7590	Capacitor—10.0 mfd. (C21)	1.40
8985	Transformer—Power transformer—105–125 volts—50–60 cycles	4.26
9002	Transformer—Power transformer—105–125 volts—25–50 cycles	6.00
	REPRODUCER ASSEMBLIES	
6467	Transformer—Output transformer (T2)	1.44
9041	Coil assembly—Comprising field coil, magnet and cone support (L11)	2.92
9043	Reproducer complete	5.50
9428	Cone—Reproducer cone (L10)—Package of 5	5.00

Stock No.	DESCRIPTION	List Price
	MOTOR ASSEMBLIES	
3731	Motor mounting assembly—Comprising three felt washers, three cushions, six metal washers and three studs	$0.46
8989	Motor—Motor complete—105–125 volts—60 cycle	18.52
8990	Motor—Motor complete—105–125 volts—50 cycle	18.52
8991	Motor—105–125 volts—40 cycle	23.36
8992	Motor—Motor complete—105–125 volts—25 cycle	23.36
8993	Rotor and shaft for 105–125 volts, 60 cycle motor	7.00
8994	Spindle—Turntable spindle with fibre gear for 60 cycle motor	4.75
8995	Rotor and shaft for 105–125 volts, 50 cycle motor	7.00
8996	Spindle—Turntable spindle with fibre gear for 50 cycle motor	4.75
8997	Rotor and shaft for 105–125 volts, 40 cycle motor	8.00
8998	Spindle—Turntable spindle with fibre gear for 40 cycle motor	5.50
8999	Rotor and shaft for 105–125 volts, 25 cycle motor	8.00
9001	Spindle—Turntable spindle with fibre gear for 25 cycle motor	5.50
	PICKUP, PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—10 sets	.40
3388	Screw—Pickup needle holding screw—Package of 10	.60
3389	Rod—Automatic brake trip rod with lock nut—Pkg. of 5	.40
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3600	Coil—Pickup coil	.50
6346	Back—Pickup housing back	.45
6474	Pickup—Pickup unit complete	4.00
7593	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut and washer	6.00
	TURNTABLE ASSEMBLIES	
3261	Bushing—Rubber bushing—Used on turntable spindle for long playing records—Package of 5	.40
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groov-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Pkg. of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable—Complete	5.50
	MISCELLANEOUS PARTS	
2947	Leather—Friction leather—Package of 20	.50
3322	Switch—Automatic brake switch with mounting screws	.75
3430	Box—Needle box with lid—Package of 2	.90
3615	Knob—Phonograph volume control or range switch knob—Package of 5	.60
6475	Volume control—Phonograph volume control (R14)	1.25
10174	Springs—Automatic brake springs—One set of 4 springs	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Package of 5	.40

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PL 29

RCA Victor Company, Inc.

CAMDEN, N. J., U. S. A.

23936

Printed in U. S. A.

Instructions for

RCA Victor 330

Seven-Tube Double-Range Superheterodyne Radio-Phonograph Combination

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INSTALLATION

Preliminary—After withdrawing the instrument from the shipping container and removing the packing framework bolted to the underside of the cabinet, take off the rear cover which is fastened by screws at the edges.

The motor is flexibly mounted and supported for shipment by a vertical wood prop from the floor of the cabinet. Remove this prop. Remove also the two red hex-head bolts which pass through the mounting rails, and the two wood blocks from between the motor board and the mounting rails. The motor board should then float freely on its spring suspension.

Radiotrons—The Radiotrons are shipped installed in the sockets. Before replacing the rear cover, refer to the tube location diagram on the license label inside the cabinet, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron only, the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Phonograph Compartment—Raise the lid of the cabinet and remove the packing material from the playing compartment. Insert the used-needle cup (packed in outfit package) in the opening provided. With the speed shifter set in the outward (78 R. P. M.) position, install the turntable on the motor spindle. Make sure that the spindle drive key engages the slot in the turntable hub.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long, including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects and should be run neither close nor parallel to electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length will be found satisfactory. An outdoor antenna of greater length, however, should improve reception and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads for connecting to the antenna and ground extend from beneath the base panel of the instrument. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the license label.

OPERATION—RADIO

The radio operating controls, located on the front panel, are shown in Figure 1. Proceed as follows:

1. Set the Transfer Switch in the counter-clockwise position, for radio reception.

2. Apply power by turning the Tone Control clockwise from the "off" position; continue rotation of this control to the opposite extremity for full-range reproduction. Several seconds are required for the Radiotrons to heat before reception is possible.

3. Set the Frequency Range Switch for the band desired, as follows:

(a) *Counter-clockwise*—540–1500 kilocycle broadcast band. The dial scale reads directly in kilocycles for this band when one cipher is added to the large numerals adjacent to the graduations.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the top of the dial (add one cipher to obtain kilocycles). The following services are included in this band:

(1) **Police Calls**—Stations operating at 1712 kilocycles, and between 2400 and 2500 kilocycles.

(2) **Amateur Radio "Phone"**—Assigned band 1900–2000 kilocycles.

(3) **Aviation Reports, Airport Beacons, Etc.**—Assigned band 2000–2400 kilocycles.

(4) **Amateur Radio "CW"** (Code)—Assigned band 1715–1900 kilocycles. Signals of this class normally are unintelligible or inaudible with this type of receiver.

NOTE—The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

4. Set the Radio Volume Control near "Medium" on its illuminated scale. Then turn the Station Selector slowly over the range of its dial until a station is heard. If no signal is received, advance the volume control further in a clockwise direction and again rotate the selector.

5. When a desirable station signal is heard, accurate tuning for *best* reproduction is accomplished as follows:

(a) Turn the Radio Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position mid-way between the points where the quality becomes poor or the signal disappears.

(c) Adjust the Volume Control to obtain the desired sound level.

> NOTE—The *automatic volume control* built into this instrument will maintain the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the volume control.

6. Turn the Tone Control counter-clockwise if reduced high-frequency (treble) response is preferred, or if interference (static) is excessive.

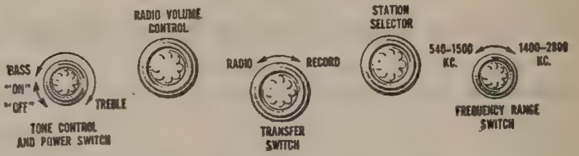

Figure 1

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

OPERATION—PHONOGRAPH

Electric phonograph facilities are provided in this instrument for playing either standard 78 R. P. M. (revolutions per minute) or long playing 33⅓ R. P. M. records of any diameter up to 12 inches. Refer to Figure 1 and proceed as follows:

1. Set the Transfer Switch clockwise, for record reproduction.

2. Apply power by turning the Tone Control clockwise from the "off" position. Set this control in the extreme clockwise position. A few seconds are required for the Radiotrons to heat before reproduction is possible.

3. Place the desired record on the turntable. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle or, if preferred, either the *green Chromium* or the full volume *Tungstone* needle. Ordinary steel needles (full volume) can be used with standard (78 R. P. M.) records, provided a new needle is inserted for each selection

> NOTE—With care, the orange Chromium needle should play 25, the green Chromium 75 to 100, and the Tungstone 100 to 200 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly), as damage to the record grooves would result.* Do not use *Tungstone* needles with thin, flexible records or with transparent-faced (illustrated) records.

4. Pull the starting lever (right-hand side of turntable) forward to start the turntable. Set the speed shifter (left-hand side of turntable) for the speed—78 or 33⅓ R. P. M.—corresponding to the record on the turntable. Then place the needle on the smooth outer surface of the record and slide it into the first groove.

> NOTE—The speed shifter should **not be moved** inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

5. Adjust the Record Volume Control (knob at front right-hand corner of motorboard) to obtain the desired volume.

6. For most faithful reproduction, the Tone Control should be left in the fully clockwise position while using the phonograph. Turning this control counter-clockwise decreases the treble response and reduces the needle scratch noise—particularly noticeable on old records—reproduced by the loudspeaker.

7. Close the lid while playing. As the lid rests on a sound-proof cushion, needle scratch and other noises incident to record playing are thus rendered far less prominent.

8. At the completion of the record, lift the pickup arm and move it toward the right to stop the motor (motor stops automatically at the end of a record having the *eccentric* final groove). Lower the pickup outside the turntable—never allow it to rest on the record (or turntable) when not operating the phonograph.

9. When through operating, close the lid and turn "off" the power switch.

Lubrication—The motor should be lubricated with light oil once every six months. Two oil holes on top of the motor are accessible when the turntable is removed. The ball bearing mechanism under the turntable should be lubricated once a year by prying off the cover and packing with vaseline or light motor grease, being careful to prevent any dirt particles from entering with the grease. Make sure that the speed shifter is in the outward (78 R. P. M.) position before replacing the turntable on the spindle.

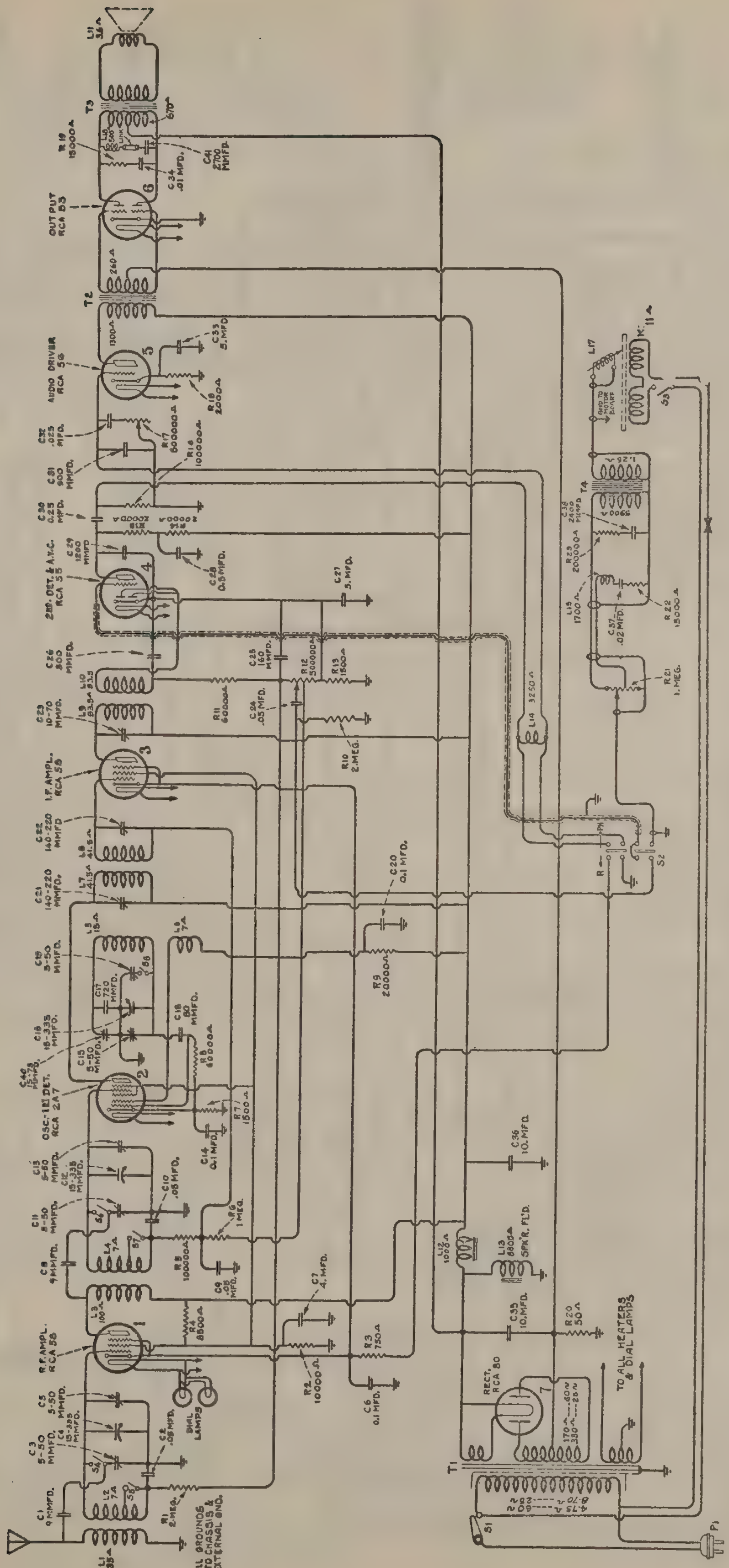

Figure A—Schematic Circuit Diagram

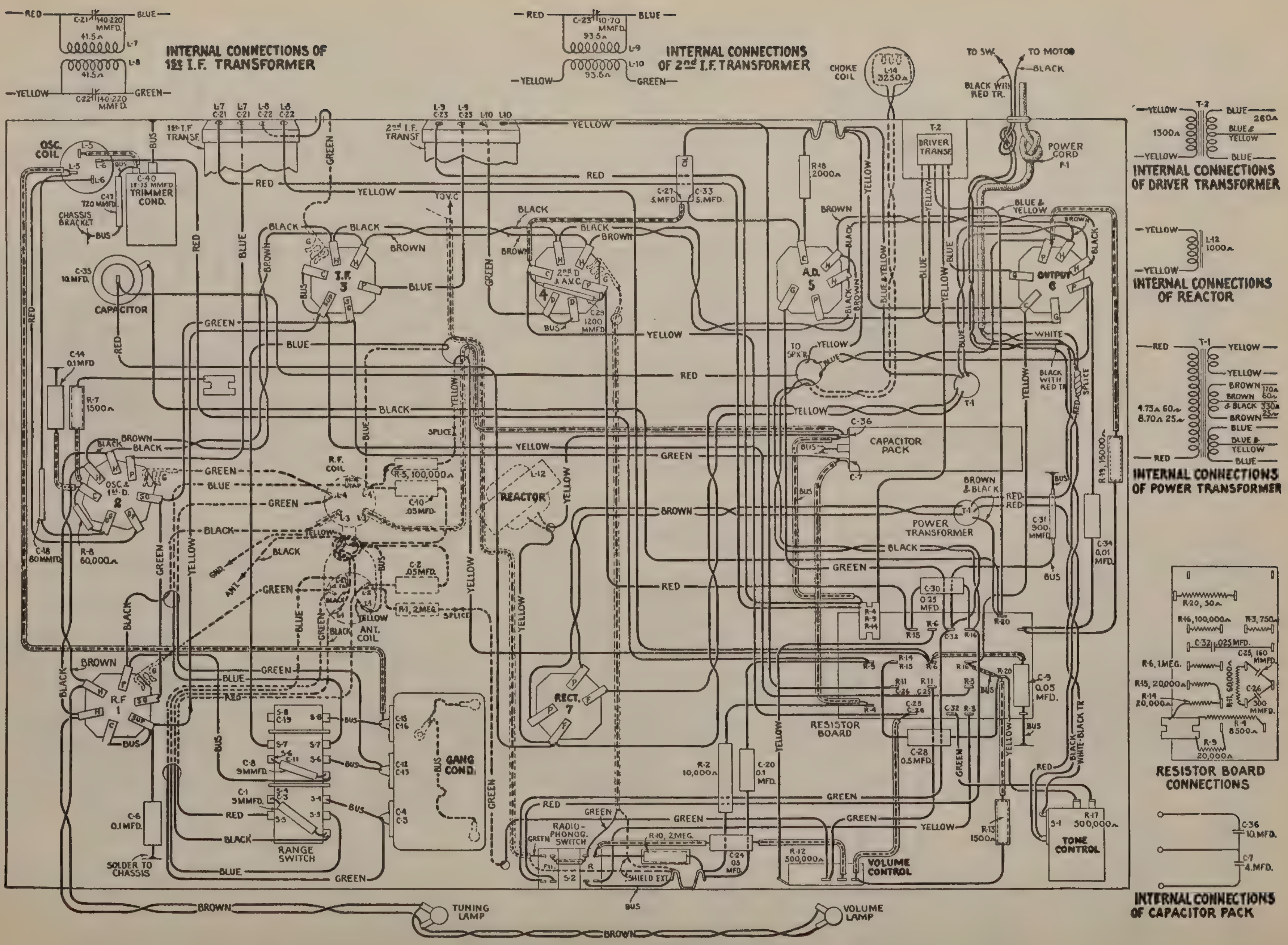

Figure B—Receiver Wiring Diagram

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating............25, 30, 40, 50, and 60 Cycles
Power Consumption..................25 Cycle–115 Watts;
30 Cycle–115 Watts; 40 Cycle–125 Watts;
50 Cycle–115 Watts; 60 Cycle–120 Watts
Number and Types of Radiotrons...2 RCA-58, 1 RCA-2A7,
1 RCA-55, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 7
Undistorted Output..............................5 Watts
Frequency Range..................540 K. C. to 1500 K. C.
and 1400 K. C. to 2800 K. C.

This combination instrument utilizes the standard two-speed motorboard and a new seven tube superheterodyne radio receiver. Excellent fidelity on both radio and record is obtained due to properly designed circuits and a Class "B" output stage. Other features of the receiver are automatic volume control, eight inch dynamic loudspeaker, continuously variable tone control, and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

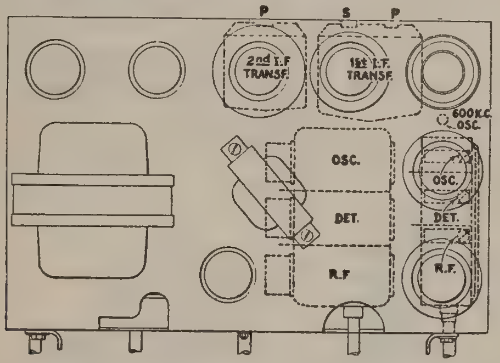

Figure C—Location of Line-Up Capacitor Screws

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure B the wiring diagram, and Figure D the assembly wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, and RCA-55 functioning a combined second detector and automatic volume control, an audio stage using an RCA-56, an output stage using RCA-53 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three gang variable capacitor and 600 K. C. trimmer screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 and 2400 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K. C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure C, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.

(d) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under (a) and (b).

(e) Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Fidelity—A link is provided in the filter circuit connected across the plates of the Radiotron RCA-53. Opening this link increases the high frequency range of the phonograph approximately 2000 cycles. The link is accessible by removing the filter unit from the cabinet.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A. F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

* Voltages and current apply to detector portion of tube.

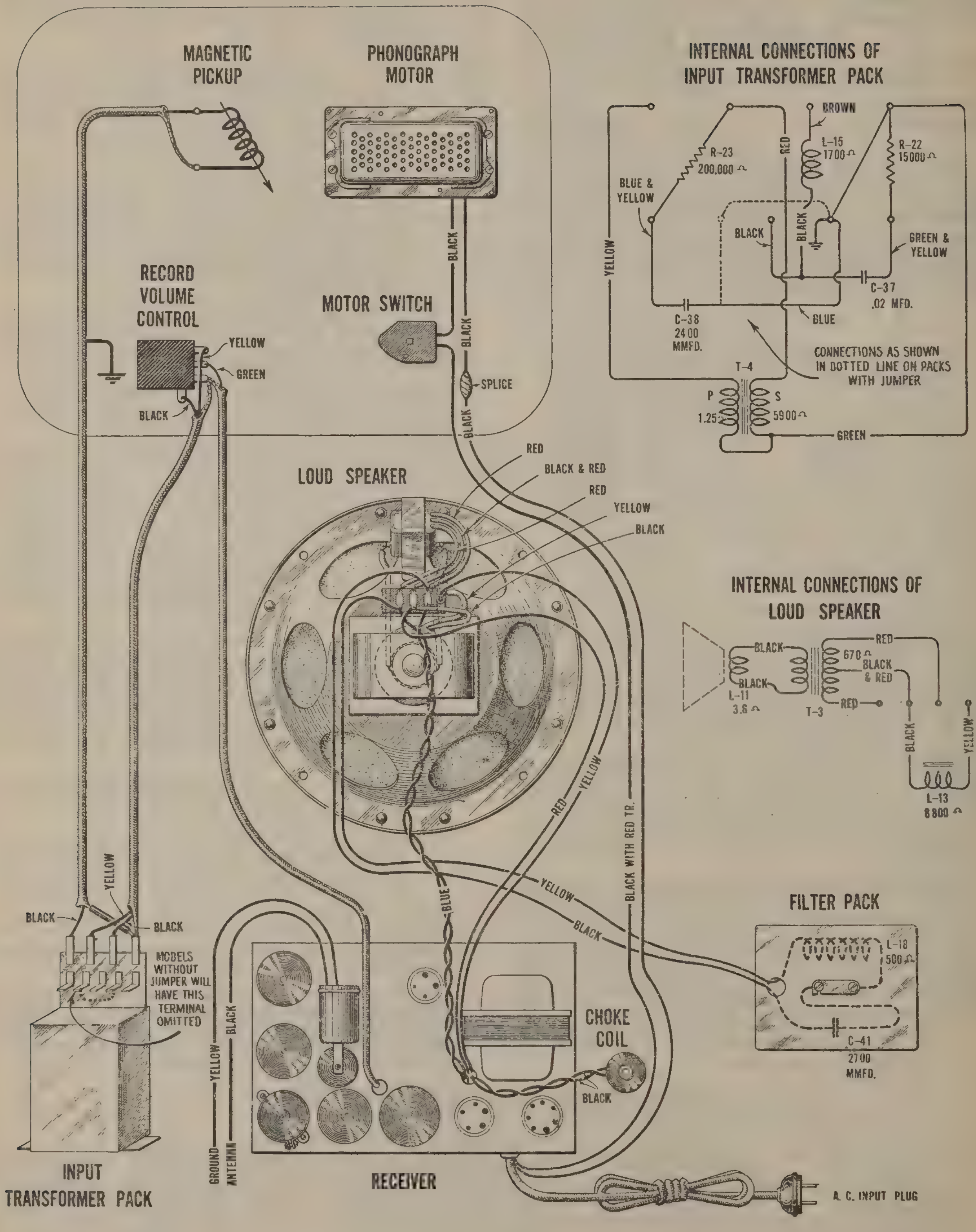

Figure D—Assembly Wiring Diagram

SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

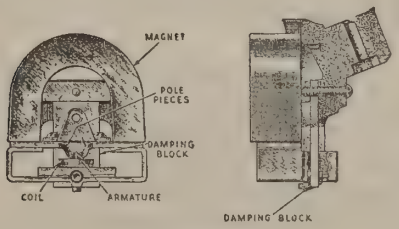

Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

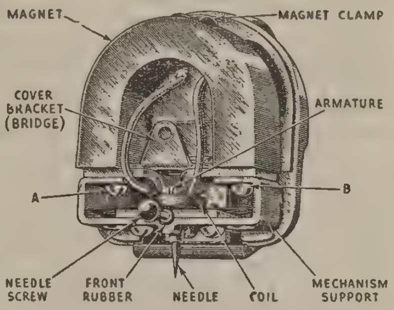

Figure G

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

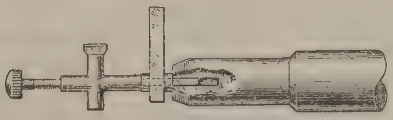

Figure H

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.—C17	$0.75
3047	Resistor—1500 ohms—Carbon type—½ watt—Pkg. of 5—R-7, R-13	1.00
3076	Resistor—1 megohm—carbon type—½ watt—Pkge of 5—R6	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Pkge of 5—R5, R16	1.00
3459	Capacitor—80 mmfd.—C18	.44
3460	Capacitor—1200 mmfd.—C29	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt—Pkge of 5—R-18	1.00
3536	Capacitor—Comprising two 5.0 mfd.—C27, C33	1.10
3555	Capacitor—0.1 mfd. C6	.36
3572	Socket—7 contact radiotron socket	.38
3584	Ring—Antenna, R.F. or oscillator coil retaining ring—Pkge of 5	.40
3592	Knob—Station selector, radio-phonograph switch or volume control knob—Pkge of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Pkge of 5—R-8	1.00
3616	Capacitor—300 mmfd.—C26	.34
3623	Shield—Antenna or R.F. coil shield	.30
3627	Knob—Range switch or tone control knob—Pkge of 5	.75
3630	Resistor—10,000 ohms—Carbon type—3 watt—R2	.25
3634	Capacitor—160 mmfd.—C25	.34
3640	Capacitor-.05 mfd.—C2, C9, C10, C24	.25
3641	Capacitor—0.1 mfd. C14, C20	.35
3719	Socket—7 contact radiotron socket—Output	.30
3761	Scale—Volume control dial scale	.60
3765	Capacitor—.025 mfd.—C32	.34
3769	Resistor—750 ohms—Carbon type—½ watt—Pkge of 5—R3	1.00
3770	Resistor—50 ohms—Wire wound—Porcelain type—R20	.34
3771	Resistor—8500 ohms—Carbon type—3 watt—R4	.25
3772	Capacitor—0.5 mfd.—C28	.32
3773	Capacitor—0.25 mfd.—C30	.36
3783	Capacitor—9 mmfd.—Pkge of 2—C1, C8	.50
3784	Capacitor—900 mmfd. C31	.30
3787	Capacitor—.01 mfd.—C34	.30
3788	Coil—High frequency compensator choke coil—L14	1.00
3814	Socket—Station selector or volume control lamp socket	.32
6188	Resistor—2 megohm—Carbon type—½ watt—Pkge of 5—R1	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Pkge of 5—R19	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Pkge of 5—R11	1.00
6300	Socket—4 contact radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkge of 5—R9, R14, R15	1.00
6471	Coil—Oscillator coil—L5, L6	.74
6527	Coil—Antenna coil—L1, L2	1.08
6528	Coil—R. F. coil assembly—L3, L4	.94
6551	Transformer—Audio driver transformer—T2	1.48
6552	Reactor—Filter reactor—L12	1.04
6553	Transformer—First intermediate frequency transformer—L7, L8, C21, C22	1.56
6554	Transformer—Second intermediate frequency transformer L9, L10, C23	1.64
6555	Capacitor Assembly—Comprising one 10 mfd. and one 4 mfd. capacitor—C7, C36	1.64
6557	Scale—Station selector dial scale	.78
6593	Condenser—3 gang variable tuning condenser	3.25
6594	Volume Control—R12	1.40
6595	Tone Control—R17	1.46
6596	Switch—Range switch	1.25
6597	Switch—Radio phonograph switch	1.10
6674	Output Filter—Comprising reactors and capacitor—L18, C41	1.60
7062	Capacitor—Adjustable trimming capacitor—15 to 70 mmfd.—C40	.50
7484	Socket—5 contact radiotron socket	.35
7485	Socket—6 contact radiotron socket	.40
7590	Capacitor—10 mfd.—C35	1.40
9026	Transformer—Power transformer—105-125 volt—50-60 Cycles—T1	4.80
9035	Transformer—Power transformer—105-125 volts—25-40 cycles	6.00

Stock. No.	DESCRIPTION	List Price
	MISCELLANEOUS	
3322	Switch—Automatic brake switch with mounting screws	$0.75
3391	Motor board suspension spring assembly—Comprising 1 bolt, 1 top spring, 1 bottom spring, 2 cup washers, 1 "C" washer and 1 nut	.50
3430	Box—Needle box with lid—Pkge of 2	.90
3824	Nut—Cap nut—Pkge of 4	.82
6288	Knob—Phonograph volume control knob—Pkge of 5	1.00
6657	Cable—Two conductor shielded cable—From transformer pack to volume control	.20
6804	Volume Control—Phonograph volume control—R21	1.60
7632	Transformer Pack—Comprising input transformer, two reactors, one 2400 mmfd., one 300 mmfd., one .02 mfd. capacitors, one 200,000 ohm, one 15000 ohm resistor—In metal container—T4, L5, L16, C37, C38, C39, R22, R23	5.45
10174	Springs—Automatic brake springs—Pkge of 4	.50
10184	Plate—Automatic brake latch trip plate with mounting screws—Pkge of 5	.40
	MOTOR ASSEMBLIES	
3398	Motor Mounting Assembly—Comprising 2 cup washers, 4 springs and 1 "C" washer	.48
3817	Stud—Motor mounting stud—Package of 3	.18
8989	Motor—105-125 volts—60 cycles	18.52
8990	Motor—105-125 volts—50 cycles	18.52
8991	Motor—105-125 volts—40 cycles	23.36
8992	Motor—105-125 volts—25 cycles	23.36
	PICKUP AND PICKUP ARM ASSEMBLIES	
3386	Cover—Pickup cover	.56
3387	Screw Assembly—Pickup mounting screw assembly comprising one screw, one nut and one washer—Package of 10	.40
3388	Screw—Pickup needle holding screw—Pkge of 10	.60
3389	Rod—Automatic brake trip rod—Pkge of 5	.40
3390	Escutcheon—Pickup arm escutcheon	.46
3417	Armature—Pickup armature	.72
3419	Screw—Cover mounting screw—Pkge of 10	.40
3516	Damper Assembly—Comprising 1 upper and 1 lower drawer, 1 upper and 1 lower bearing—For pickup base	.14
3521	Cover—Pickup back cover	.18
3737	Damper—Viscoloid damping block—Pkge of 5	.65
6346	Back—Pickup housing back	.45
6601	Pickup—Magnetic pickup complete	4.54
6602	Coil—Pickup coil—L17	.65
7659	Arm—Pickup arm complete less pickup and escutcheon	4.60
	TURNTABLE ASSEMBLIES	
3338	Ring—Clamp ring assembly—Comprising spring, latch lever and stud	.50
3340	Washer—Thrust washer—Pkge of 2	.56
3341	Pin—Groove pin—Pkge of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Pkge of 2	.56
3343	Sleeve—Sleeve complete with ball race	2.86
3344	Cover—Grease retainer cover—Pkge of 2	.70
3346	Bushing—Speed shifter lever brushing—Pkge of 4	.66
3347	Spring—Speed shifter lever spring—Pkge of 2	.30
3399	Lever—Speed shifter lever with mounting screws	.50
7084	Cover—Suede cover for turntable	.40
8948	Turntable Complete	5.50
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Pkge of 5	.50
6556	Transformer—Output transformer—T3	1.50
8969	Cone—Reproducer cone—L11—Pkge of 5	6.35
9434	Coil Assembly—Comprising field coil magnet and cone support—L13	4.66

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RCA Victor Company, Inc.
CAMDEN, N. J., U. S. A.

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Printed in U. S. A.

Instructions for

RCA Victor 331

Seven-Tube Double-Range Superheterodyne Automatic Phonograph Combination

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INTRODUCTION

Many new and remarkable developments have been incorporated in this beautiful combination instrument. Excellent reproduction and great volume on both radio and phonograph are made possible by a Class "B" output stage (using the new RCA-53 twin-amplifier Radiotron) and a large electrodynamic loudspeaker.

In addition to providing the usual broadcast entertainment from stations in the 540–1500 kilocycle band, the receiver can be tuned to receive stations transmitting in the range from 1500 to 2800 kilocycles. The latter range permits "listening in" to police calls, amateur radio "phone" communication, etc.—a fascinating diversion.

Vernier tuning has been accomplished by a new type ball-bearing reduction drive, insuring smooth operation and long life. Illuminated 45 degree dials, designed for maximum visibility and minimum glare, have been provided on both the station selector and the radio volume control.

The automatic two-speed phonograph mechanism is of a new type, improved in capabilities and appearance, and simplified in construction and operation. The device will play and change automatically either ten-inch or twelve-inch diameter records, of practically all standard varieties. Record changing is accomplished in a minimum interval of four seconds. Sound-proofing of the playing compartment is an innovation which successfully eliminates most of the mechanical noise incident to playing and changing of records.

INSTALLATION

Preliminary—After withdrawing the instrument from the shipping container and removing the packing framework bolted to the underside of the cabinet, take off the rear cover, which is fastened by screws at the edges.

The flexibly mounted motor board is supported for shipment by a rough wood framework, fastened by screws to the motor-board mounting rails and braced by a vertical wood prop from the floor of the cabinet. Remove this packing material. Remove also the two red hex-head bolts which pass through the mounting rails, and the two wood blocks from between the motor board and the mounting rails. The motor board should then float freely on its spring suspension.

Radiotrons—The Radiotrons are shipped installed in the sockets. Refer to the tube location diagram on the license label inside the cabinet, and *make certain:*

(a) That all tubes are in the proper sockets and pressed down firmly. *Never apply power to the instrument unless all Radiotrons are in place.*

(b) That all shields are rigidly in place over the Radiotrons shown by double circles on the diagram.

(c) That the short flexible leads shown on the diagram are attached to the top grid contacts of the proper Radiotrons as indicated, and that the spring contact caps are pressed down firmly.

NOTE—For the RCA-55 Radiotron only, the grid lead must be enclosed by the cylindrical tube shield. A slot is provided at the bottom of this shield for entrance of the lead.

Phonograph Compartment—Raise the lid of the cabinet and remove the packing material from the playing compartment. Insert the used-needle cup (packed in outfit package) in the opening provided, as shown in Figure 2. With the speed shifter set in the outward (78 R. P. M.) position, install the turntable on the motor spindle. Make sure that the spindle drive key engages the slot in the turntable hub.

NOTE—Some instruments have one or more shim washers on the motor spindle to adjust the turntable to the proper height. Do not remove any of these washers. Before mounting the turntable make sure that the washers are seated on the hub, with the drive key projecting through the slots so as to engage the turntable.

Location—The instrument should be located close to the antenna lead-in and ground connections, and near an electrical outlet.

Antenna and Ground—An antenna 25 to 75 feet long. including the lead-in and ground connections, is recommended. The antenna should be well insulated from all objects, and should not be run close to or parallel with electric circuits inside or outside the building. Generally, an indoor antenna of short or medium length should be found satisfactory. An outdoor antenna of greater length may provide some increase in the receiving range, and is recommended for localities remote from broadcasting stations. When the receiver is installed in a building of metallic construction, an outdoor antenna is *required* for satisfactory results.

A *good* ground connection is essential for best performance. It should be as short and direct as possible, and preferably should be made to a cold water pipe. An approved ground clamp should be used to insure a tight and permanent connection.

Two flexible leads are provided at the rear of the receiver for connecting to the antenna and ground. Connect the *black* lead to the antenna wire or lead-in and the *yellow* lead to the ground wire. Both connections should be soldered and wrapped with insulating tape.

Power Supply—Connect the power cord to an electrical outlet supplying alternating current at the proper voltage and frequency (cycles), as specified on the license label.

Operating Test—Before replacing the rear cover of the cabinet, the instrument should be given a thorough trial operation—both radio and phonograph—in accordance with the operating instructions which follow. The instrument was, of course, in perfect operating condition when shipped from the factory. After transit, however, minor adjustments sometimes may be necessary, particularly on the automatic record-changing mechanism. It is the dealer's responsibility to make sure that the instrument functions perfectly when installed.

A diagrammatic chart giving complete instructions for ordinary adjustments of the automatic mechanism is included in the Service Data section of this booklet. Whenever possible, these adjustments should be made by the dealer from whom the instrument was purchased.

OPERATION—RADIO

The radio operating controls, located on the front panel, are shown in Figure 1. Proceed as follows:

1. Set the Transfer Switch in the counter-clockwise position, for radio reception.

2. Apply power by turning the Tone Control clockwise from the "off" position. Set this control near the middle of its range. Several seconds are required for the Radiotrons to heat before reception is possible.

3. Set the Frequency Range Switch for the band desired, as follows:

(a) *Counter-clockwise*—540–1500 kilocycle broadcast band. The dial scale reads directly in kilocycles for this band when one cipher is added to the large numerals adjacent to the graduations.

(b) *Clockwise*—1400–2800 kilocycles. Frequencies in this band are indicated approximately by the positions of the small numerals at the top of the dial (add one cipher to obtain kilocycles). The following services are included in this band:

(1) **Police Calls**—Stations operating at 1712 kilocycles, and between 2400 and 2500 kilocycles.

(2) **Amateur Radio "Phone"**—Assigned band 1900–2000 kilocycles.

(3) **Aviation Reports, Airport Beacons, Etc.**—Assigned band 2000–2400 kilocycles.

(4) **Amateur Radio "CW" (Code)**—Assigned band 1715–1900 kilocycles. Signals of this class normally are unintelligible or inaudible with this type of receiver.

NOTE—The majority of stations in the 1400–2800 kilocycle band do not offer continuous programs. Police calls are usually intermittent, at regular or irregular intervals. Strong local stations in the 540–1500 kilocycle broadcast band may be audible (sometimes at more than one point on the dial) when the Frequency Range Switch is set for 1400–2800 kilocycles.

4. Set the Radio Volume Control near "Medium" on its illuminated scale. Then turn the Station Selector slowly over the range of its dial until a station is heard. If no signal is received, advance the volume control further in a clockwise direction and again rotate the selector.

5. When a desirable station signal is heard, accurate tuning for *best* reproduction is accomplished as follows:

(a) Turn the Radio Volume Control counter-clockwise (if necessary) until the volume is at a low level.

(b) Adjust the Station Selector carefully to the position mid-way between the points where the quality becomes poor or the signal disappears.

(c) Adjust the Volume Control to obtain the desired sound level.

NOTE—The *automatic volume control* maintains the volume level substantially constant irrespective of normal fluctuations of signal strength (fading). Also, other stations with good signal strength will be received at approximately the same volume without readjustment of the volume control.

6. Adjust the Tone Control to obtain the desired tone quality, or turn it counter-clockwise to reduce noise interference.

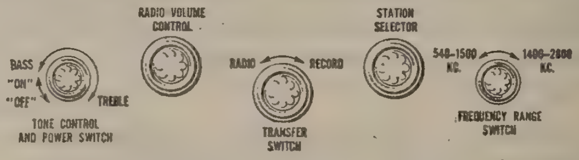


Figure 1

7. When through operating, switch off the power by turning the Tone Control knob to the extreme counter-clockwise position.

Radiotrons—Improved results may sometimes be obtained by interchanging the RCA-58 Radiotrons in their sockets. *The power should be switched off before removing any Radiotron from its socket.* Spare Radiotrons should be kept on hand.

OPERATION—PHONOGRAPH

General

Electric phonograph facilities are provided in this instrument for automatic or manual playing of either standard 78 R. P. M. (revolutions per minute) or long-playing 33⅓ R. P. M. records.

The automatic mechanism provides for playing up to approximately eight 10-inch or seven 12-inch diameter records in sequence on one side, without attention. The exact number depends on the flatness and the thickness of the records. Records having the eccentric inside groove, also most records of other types, may be played and changed automatically.

Records of any diameter up to 12 inches may be played manually, in the same manner as with the ordinary non-automatic phonograph models.

Lubrication—It is recommended that the automatic mechanism, together with the two-speed turntable and phonograph motor, be thoroughly inspected, cleaned and lubricated by a competent dealer's service man at the end of each year of operation.

Automatic Operation

Important—For proper operation of the automatic mechanism, *the instrument must be level.* If the floor is uneven, one or more legs should be blocked to level the instrument solidly. (See Note 2, paragraph 8, under "Procedure.")

CAUTION—***Never touch any part of the automatic mechanism while it is changing records.***

Procedure—Refer to Figure 2, showing the phonograph equipment. Proceed as follows:

1. Set the Transfer Switch (Figure 1) clockwise, for record reproduction.

2. Apply power by turning the Tone Control (Figure 1) clockwise from the "off" position. Set this control in the extreme clockwise position.

3. With the Motor Switch in the "off" position (Record Volume Control fully counter-clockwise), load the turntable with records, as follows:

(a) Set the Index Lever at "Manual." *Always do this before loading or unloading records.*

(b) Place the electric pickup on the rubber rest.

(c) Raise the Record Ejector arm (*very slowly*, at first, until the internal weight has rolled to the rear of the arm, then as rapidly as desired) to its upper position of rest. *Always raise the ejector arm in this manner.*

(d) Select the records to be played. *All records for one loading must be of the same size (either ten or twelve inches in diameter) and the same speed (either standard or long-playing).*

CAUTION—*Do not use thin flexible-type records for automatic operation. Transparent-faced (illustrated) records can be used, if close to standard thickness, but must not be reproduced with Tungstone needles.*

(e) Place the records, one at a time, on the turntable. ***Make sure that the first record placed on the turntable (last to be played) is flat—that is, not warped.*** The spindle should resume its normal height after each record is added. The turntable is fully loaded when the top surface of the uppermost record is nearly flush with the top of the spindle. (It should not be possible to slide off the top record without lifting its edge or depressing the spindle.)

(f) Lower the Record Ejector arm gently onto the spindle.

(g) Make certain that the record pocket (at the left of the phonograph compartment) is empty.

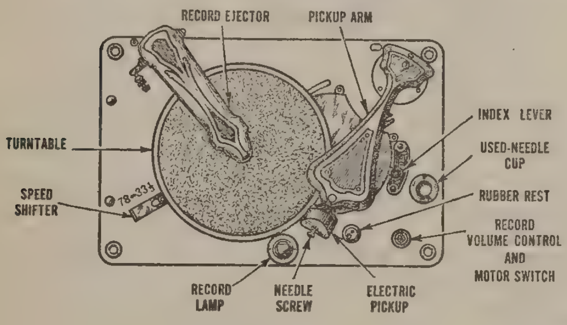


Figure 2

4. Insert a *new* needle in the pickup as far as it will go and tighten the needle screw. For long-playing (33⅓ R. P. M.) records, use *only* the *orange Chromium* needle. For standard (78 R. P. M.) records, use the latter needle, or, if preferred, either the *green Chromium* or the full volume (full tone) *Tungstone* needle.

NOTE—With care, the orange Chromium needle should play 25, the green Chromium 75 to 100, and the Tungstone 100 to 200 records. *Never re-insert in the pickup a Chromium needle which has been used (however slightly), as damage to the record grooves would result.*

5. Place the pickup needle on the smooth outer rim of the record, near the first groove. Then move the Index Lever to the position (12 or 10) corresponding to the diameter (inches) of the records on the turntable. Be careful not to move the lever *beyond* the proper index hole. Push the index pin firmly into the hole.

CAUTION—***Never attempt to move the Index Lever from the Manual position when the pickup is on the rubber rest.***

6. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed (78 or 33⅓ R. P. M.) corresponding to the records on the turntable.

NOTE—The speed shifter should not be moved inward (from the 78 to the 33⅓ R. P. M. position) while the turntable is at rest.

7. Adjust the Record Volume Control to obtain the desired volume.

8. Close the lid to confine mechanical sounds within the playing compartment. If needle scratch (particularly noticeable on old records) is objectionably reproduced by the loudspeaker, turn the Tone Control slightly counter-clockwise. For most faithful reproduction, however, the Tone Control should be left in the fully clockwise position.

NOTE 1—When a record has been played, the ejector arm slides it off into the record pocket and the pickup moves to the outside of the next record. The records on the turntable are thus played consecutively until only one record remains on the turntable. This record will be played repeatedly until the motor is stopped by means of the Motor Switch.

NOTE 2—After a record has been played and changed, the needle is lowered automatically onto the smooth rim of the next record and is fed by gravity into the starting groove. After the instrument has been leveled with reference to the top of the cabinet, further slight compensation may be necessary, thus: (1) If the needle fails to enter the playing groove, the right-hand side of the instrument must be raised by inserting thin blocks under the front and rear legs on that side; or (2) If the needle slides over several grooves, thus failing to reproduce the beginning of the selection, the left-hand side of the instrument must be similarly raised.

9. To reject a record while playing, lift the pickup arm and move it to the extreme left. Hold the pickup lightly until it is moved by the mechanism.

10. Before reloading or when through operating, turn the Motor Switch to the "off" position, set the index lever at "Manual" and place the pickup on the rubber rest. Never leave the pickup resting on a record (or on the turntable) when not in use. Turn the power switch "off" when discontinuing operation of the instrument.

Manual Operation

Individual records can be played manually, as follows:

1. Set the Transfer Switch and Tone Control Knobs clockwise, as directed for automatic operation.

2. Make sure that the Index Lever is at "Manual," the pickup is on the rubber rest, and the Motor Switch is in the "off" position.

3. Raise the Record Ejector arm to the upper resting position. See paragraph 3 (c) under Automatic Operation.

4. Place a record on the turntable and lower the ejector arm (to permit closing lid). For needle information, see paragraph 4 under Automatic Operation.

NOTE—Ordinary steel needles (full volume or full tone) can be used with standard (78 R. P. M.) records, provided a new needle is inserted for each selection. Do not use *Tungstone* needles with thin flexible records or with transparent-faced (illustrated) records.

5. Start the turntable by turning the Motor Switch clockwise; then set the Speed Shifter for the speed corresponding to the record on the turntable. Lower the needle gently onto the smooth outer rim of the record.

6. Adjust the Record Volume Control and close the lid of the cabinet. See paragraph 8 under Automatic Operation.

7. At the completion of the record, lift the pickup arm and move it toward the right to stop the motor (motor stops automatically at the end of a record having the *eccentric* final groove). Turn the Motor Switch to the "off" position and place the pickup on the rubber rest.

8. When through operating, close the cabinet lid and turn "off" the power.

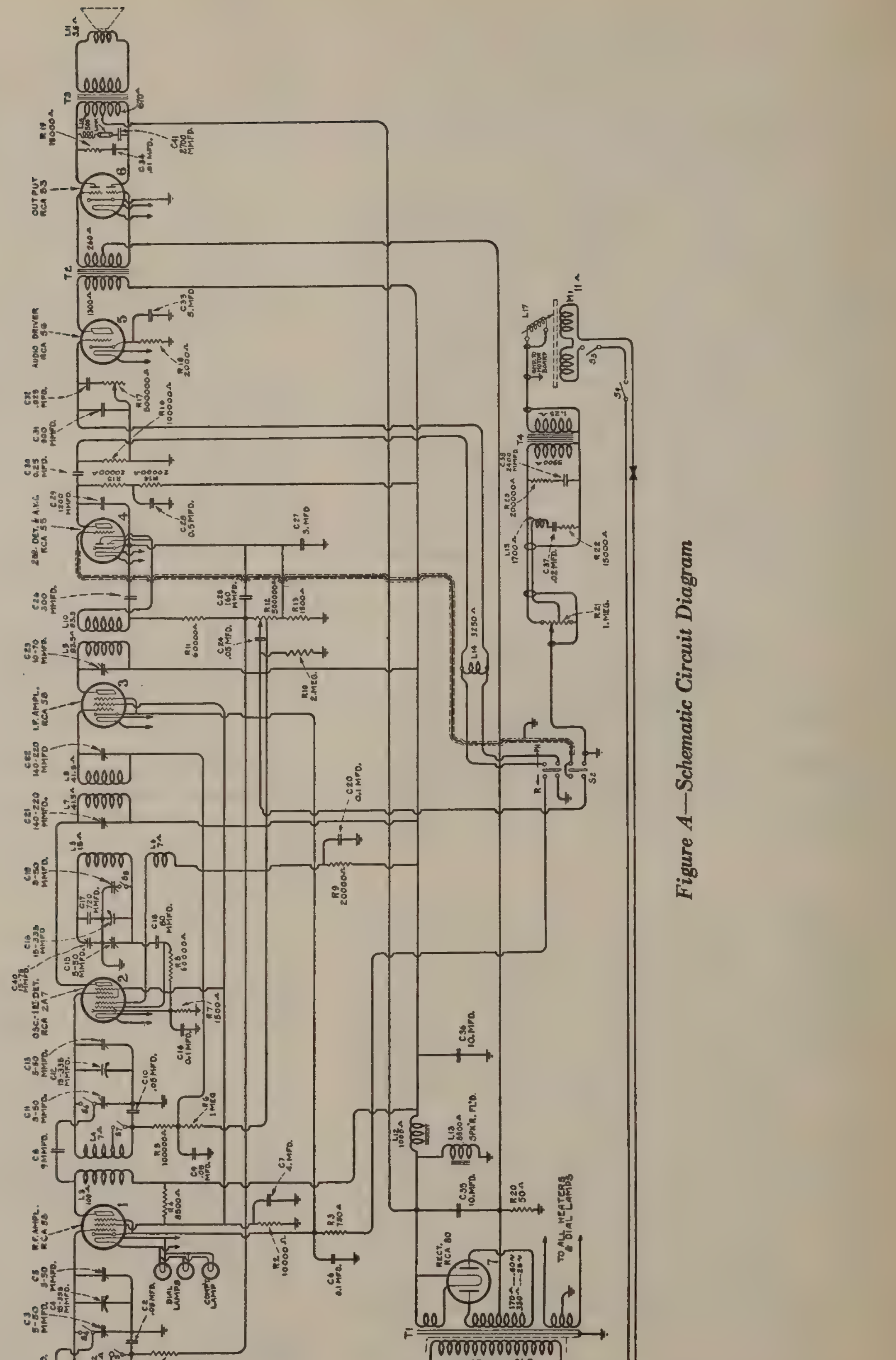


Figure A—Schematic Circuit Diagram

SERVICE DATA

Voltage Rating............................105–125 Volts
Frequency Rating..............25, 30, 40, 50, and 60 Cycles
Power Consumption..................25 Cycle–115 Watts;
30 Cycle–115 Watts; 40 Cycle–125 Watts;
50 Cycle–115 Watts; 60 Cycle–120 Watts
Number and Types of Radiotrons...2 RCA-58, 1 RCA-2A7,
1 RCA-55, 1 RCA-56, 1 RCA-53, 1 RCA-80—Total 7
Undistorted Output.............................5 Watts
Frequency Range..................540 K. C. to 1200 K. C.
and 1400 K. C. to 2800 K. C.

This combination instrument utilizes the new perfected automatic record changing mechanism and a new seven-tube superheterodyne radio receiver. Excellent fidelity on both radio and record is obtained due to properly designed circuits and a Class "B" output stage. Other features of the receiver are automatic volume control, eight-inch dynamic loudspeaker, continuously variable tone control, and the inherent sensitivity, selectivity and tone quality of the Superheterodyne.

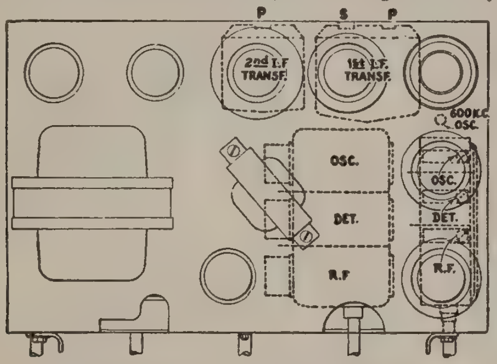


Figure B—Location of Line-Up Capacitor Screws

A special feature is a Range Switch that allows reception of signals either of the broadcast band or higher frequencies. Figure A shows the schematic circuit, Figure C the wiring diagram, and Figure D the assembly wiring. With the switch in the broadcast band position, the frequency range is from 540 to 1500 K. C. At the higher frequency position, the receiver covers the 1400 to 2800 K. C. band.

The circuit consists of an R. F. stage using Radiotron RCA-58, a combined oscillator and first detector in the RCA-2A7 tube, an intermediate stage using Radiotron RCA-58, an RCA-55 functioning a combined second detector and automatic volume control, an audio stage using an RCA-56, an output stage using RCA-53 and the RCA-80 functioning as a rectifier.

Service work in conjunction with this receiver will be similar to that of other Superheterodyne receivers incorporating a similar type automatic volume control.

I. F. Tuning Adjustments—Two transformers comprising three tuned circuits (the secondary of the second transformer is untuned) are used in the intermediate amplifier. These are tuned to 175 K. C. and the adjustment screws are accessible as shown in Figure C. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 175 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Short-circuit the antenna and ground leads and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the chassis.

(c) Connect the oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that with the receiver volume control at maximum, a slight deflection is obtained in the output meter.

(d) Adjust the primary of the second, and the secondary and primary of the first I. F. transformers until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I. F. adjustments.

R. F. and Oscillator Adjustments—The three-gang variable capacitor and 600 K. C. trimmer screws are accessible at the bottom of the chassis. The high frequency capacitor screws are located on the Range Switch. Proceed as follows:

(a) Procure a modulated oscillator giving a signal at 600, 1400 and 2440 K. C., a non-metallic screw driver such as Stock No. 7065 and an output meter.

(b) Connect the output of the oscillator to the antenna and ground lead of the receiver. Check the dial at the extreme maximum position of the tuning capacitor. The indicator should be at the last division. Connect the output meter across the cone coil. Then set the dial at 140, the oscillator at 1400 K. C. and adjust the oscillator output so that a slight deflection is obtained when the receiver volume control is at maximum. Align all three trimmer capacitors on the variable capacitor to maximum output, keeping the oscillator output as low as possible.

(c) Set the oscillator at 600 K. C. Tune in the signal with the receiver until a maximum deflection is obtained in the output meter. Now adjust the 600 K. C. series capacitor, Figure B, until a maximum deflection is obtained in the output meter. Rock the tuning capacitor back and forth while making this adjustment, as the tuning capacitor and oscillator series capacitor adjustments interlock.

(d) Change the frequency of the oscillator to 1400 K. C. and set the dial at 1400. Again make the adjustments given under A and B.

(e) Then shift the oscillator to 2440 K. C., the Range Switch to the clockwise position and the dial to 120. The three line-up capacitors located on the Range Switch should then be adjusted for maximum output.

When making both the I. F. and R. F. adjustments, the important point to remember is that the receiver volume control must be at its maximum position and the minimum input signal necessary from the oscillator must be used.

Automatic Record Changer—The automatic record changer used in this instrument is of simple design and excellent construction. The various adjustments that may be required are shown in Figure E. A point to remember with this instrument is that it must always be level, otherwise proper operation will not be obtained.

Fidelity—A link is provided in the filter circuit connected across the plates of Radiotron RCA-53. Opening this link increases the high frequency output of the phonograph approximately 2000 cycles. The link is accessible by removing the filter unit from the cabinet.

RADIOTRON SOCKET VOLTAGES

120 Volt, A. C. Line—Volume Control at Maximum

Radiotron No.	Cathode to Control Grid, Volts	Cathode to Screen Grid, Volts	Cathode to Plate, Volts	Plate Current, M. A.	Heater Volts
RCA-58 R. F.	4.0	100	245	6.0	2.4
*RCA-2A7 Osc. Det.	4.0	100	245	5.0	2.4
RCA-58 I. F.	4.0	100	245	6.0	2.4
RCA-55 2nd Det. A. V. C.	6.0	—	100	4.0	2.4
RCA-56 Driver A F.	13.0	—	235	6.3	2.4
RCA-53 Output	4.5	—	290	12.0	2.4
RCA-80 Rectifier	600 R. M. S. Plate to Plate			88.0	5.0

* Voltages and current apply to detector portion of tube.

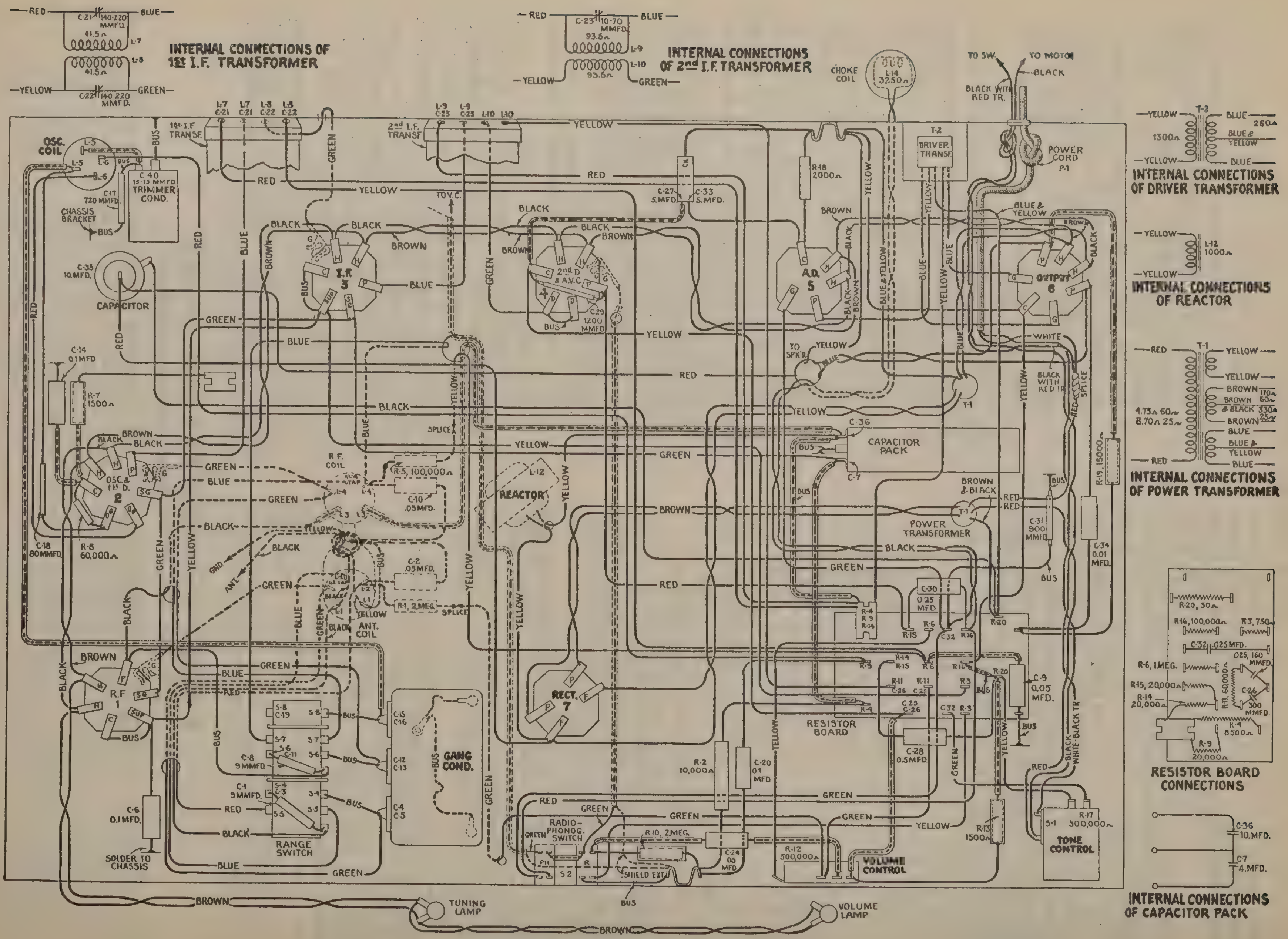


Figure B—Receiver Wiring Diagram

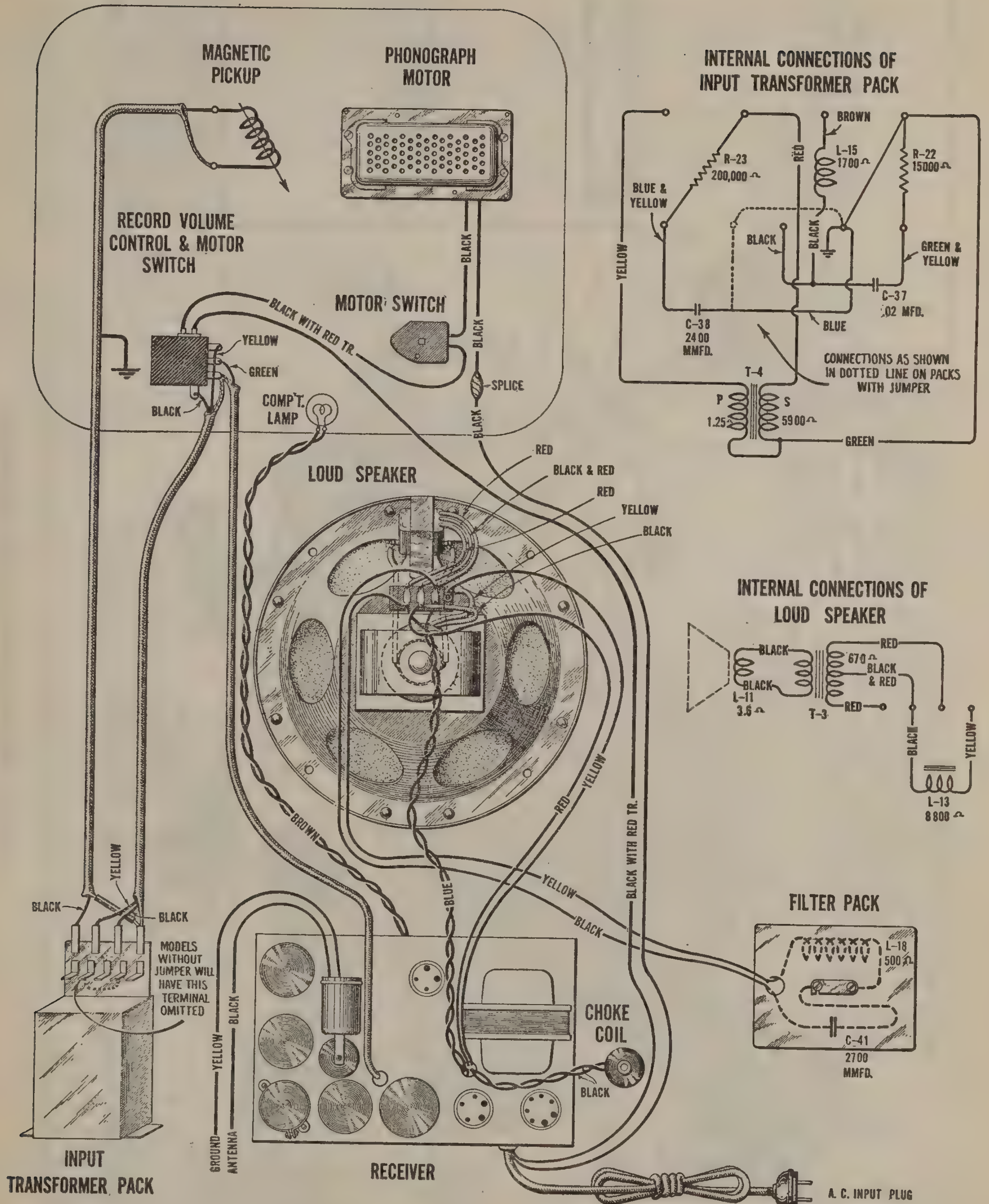
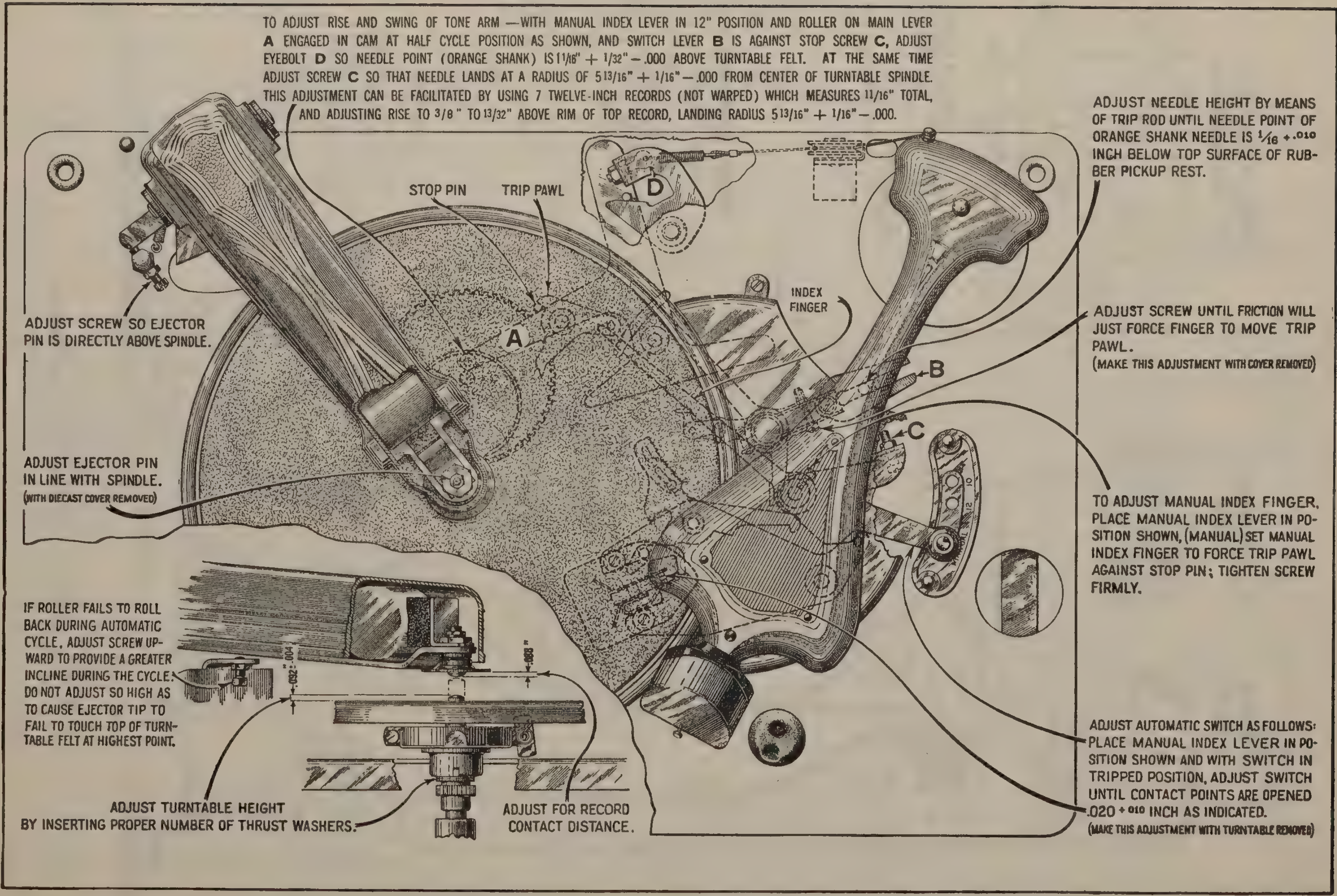


Figure D—Assembly Wiring Diagram



TO ADJUST RISE AND SWING OF TONE ARM —WITH MANUAL INDEX LEVER IN 12" POSITION AND ROLLER ON MAIN LEVER **A** ENGAGED IN CAM AT HALF CYCLE POSITION AS SHOWN, AND SWITCH LEVER **B** IS AGAINST STOP SCREW **C**, ADJUST EYEBOLT **D** SO NEEDLE POINT (ORANGE SHANK) IS 1 1/16" + 1/32" – .000 ABOVE TURNTABLE FELT. AT THE SAME TIME ADJUST SCREW **C** SO THAT NEEDLE LANDS AT A RADIUS OF 5 13/16" + 1/16" – .000 FROM CENTER OF TURNTABLE SPINDLE. THIS ADJUSTMENT CAN BE FACILITATED BY USING 7 TWELVE-INCH RECORDS (NOT WARPED) WHICH MEASURES 11/16" TOTAL, AND ADJUSTING RISE TO 3/8" TO 13/32" ABOVE RIM OF TOP RECORD, LANDING RADIUS 5 13/16" + 1/16" – .000.

ADJUST NEEDLE HEIGHT BY MEANS OF TRIP ROD UNTIL NEEDLE POINT OF ORANGE SHANK NEEDLE IS 1/16 +.010 INCH BELOW TOP SURFACE OF RUBBER PICKUP REST.

ADJUST SCREW SO EJECTOR PIN IS DIRECTLY ABOVE SPINDLE.

ADJUST SCREW UNTIL FRICTION WILL JUST FORCE FINGER TO MOVE TRIP PAWL.
(MAKE THIS ADJUSTMENT WITH COVER REMOVED)

ADJUST EJECTOR PIN IN LINE WITH SPINDLE.
(WITH DIECAST COVER REMOVED)

TO ADJUST MANUAL INDEX FINGER, PLACE MANUAL INDEX LEVER IN POSITION SHOWN, (MANUAL) SET MANUAL INDEX FINGER TO FORCE TRIP PAWL AGAINST STOP PIN; TIGHTEN SCREW FIRMLY.

IF ROLLER FAILS TO ROLL BACK DURING AUTOMATIC CYCLE, ADJUST SCREW UPWARD TO PROVIDE A GREATER INCLINE DURING THE CYCLE. DO NOT ADJUST SO HIGH AS TO CAUSE EJECTOR TIP TO FAIL TO TOUCH TOP OF TURNTABLE FELT AT HIGHEST POINT.

ADJUST AUTOMATIC SWITCH AS FOLLOWS: PLACE MANUAL INDEX LEVER IN POSITION SHOWN AND WITH SWITCH IN TRIPPED POSITION, ADJUST SWITCH UNTIL CONTACT POINTS ARE OPENED .020 + .010 INCH AS INDICATED.
(MAKE THIS ADJUSTMENT WITH TURNTABLE REMOVED)

ADJUST TURNTABLE HEIGHT BY INSERTING PROPER NUMBER OF THRUST WASHERS.

ADJUST FOR RECORD CONTACT DISTANCE.

Figure E—Automatic Record Changer Adjustments

SERVICE DATA FOR MAGNETIC PICKUP

The Magnetic Pickup used in this combination instrument is of a new design with an improved frequency range. While in physical appearance it is similar to that of the older type, details of construction are considerably different. It consists essentially of a chromium steel magnet, two thin pole pieces, a mechanism support and bracket, a coil, and an armature that is damped by means of an anchored damping block.

The use of the anchored damping block eliminates any bad peaks in the frequency range. The frequency-response characteristic is substantially flat from 50 to 5,000 cycles.

Replacing Magnet Coil, Pivot Rubbers, Armature or Damping Block

In order to replace a defective coil or the hardened pivot rubbers (see Figure G), it is necessary to proceed as follows:

(a) Remove the pickup cover by removing the center holding screw and needle screw.

(b) Remove the pickup magnet and the magnet clamp by pulling them forward.

(c) Unsolder the coil leads and remove the mechanism assembly from the back plate by releasing the two mounting screws and the damping block clamping screw.

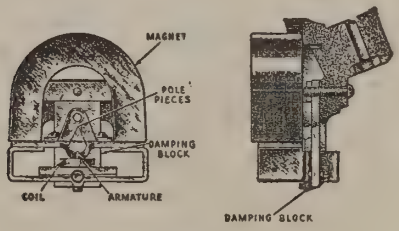


Figure F

(d) Remove screws A and B, Figure G, and then remove the mechanism assembly from the pole pieces.

(e) The coil or the front pivot rubber may now be removed and replaced. If it is desired to replace the rear pivot rubber, then the end of the armature soldered to the mechanism support must be unsoldered and the damping block removed. The rear pivot rubber now may be replaced. After putting the pivot rubbers in place a new damping block should be fastened to the armature as outlined in instructions on replacing the damping block.

(f) The mechanism should now be reassembled, except for the magnet, which must be magnetized. After being magnetized, the mechanism—with the pole pieces upward—should be placed so that the magnet may be slid from the magnetizer onto the pole pieces without breaking physical contact. After placing the pole pieces on the magnet, the entire assembly should be remagnetized thoroughly, being careful not to change the polarity obtained by the initial magnetization.

(g) After assembling to the mechanism, the entire assembly should be fastened to the back plate by means of the screws provided, making sure the damping block is securely clamped. At the same time, the metal dust cover must be placed in position.

(h) After remagnetizing, it is necessary to correctly center the armature. This may be done quite accurately by feeling its play after the needle is inserted. A little practice will quickly show which way an adjustment is necessary to have the armature centered properly. The adjustment is made by loosening screws A and B (Figure G), and sliding the mechanism slightly in relation to the pole pieces.

(i) The cover may be now replaced over the entire assembly, and the pickup returned to the tone arm.

In assembling, it may be desirable to check the armature air gap by means of a small Feeler Gauge. This air gap should be nine mils on each side of the armature. However, a little practice with the needle in place will quickly disclose whether or not the armature is centered.

Replacing the Damping Block

If it is desired to replace the damping block, it may be done in the following manner:

(a) Disassemble the pickup as described under the preceding section.

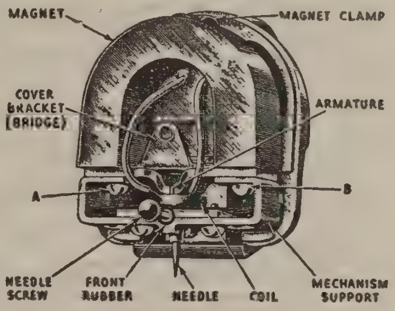


Figure G

(b) Remove the armature entirely by unsoldering it at its joint with the mechanism support.

(c) Remove the damping block from the armature and clean the bushing for holding the damping block with emery paper.

(d) Insert the armature through the new block so that it occupies the same position as that of the old. Also ascertain that the block is in correct vertical alignment with the armature. It will be noted that the hole in the damping block is somewhat smaller than the diameter of the armature. This is done so that a snug fit will be obtained.

(e) After properly locating the damping block, a soldering iron should be applied to the armature so that the block will melt slightly at its point of contact with the armature. A special tip, constructed as shown in Figure H, will prove desirable for fusing the block in place. The iron should be applied long enough to slightly melt the block and cause a small bulge on both sides, but should not be applied long enough to cause any bubbling. The pickup should then be reassembled as described in the preceding section.

Only rosin core solder should be used for soldering the coil leads in the pickup. Also rosin core solder should be satisfactory for resoldering the end of the spring in the hole in the mechanism, since both these parts have been previously tinned. In case the parts are not well tinned, it will be necessary to scrape the end of the spring and the hole in the mechanism until bright. These parts may now be tinned by using as a flux a water solution of zinc chloride (commonly called acid flux). After tinning, dip the parts in water to wash off the acid flux and thereby prevent serious subsequent corrosion. After making sure that the pivot rubbers and damping block are properly in place, as described under (e) above, the armature may now be soldered in place in the mechanism by using rosin core solder, since the parts are now tinned. Care must be exercised to get the needle hole perfectly square with respect to the mechanism, or otherwise it will be difficult if not impossible to center the armature in the airgap as explained under (h).

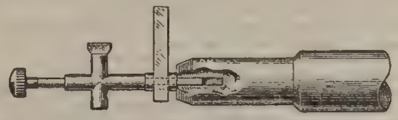


Figure H

REPLACEMENT PARTS

Insist on genuine factory tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price
	RECEIVER ASSEMBLIES	
2269	Capacitor—720 mmfd.	$0.75
2747	Cap—Contact cap—Package of 5	.50
3047	Resistor—1,500 ohms—Carbon type—½ watt—Pkg. of 5.	1.00
3076	Resistor—1 megohm—Carbon type—½ watt—Pkg. of 5.	1.00
3252	Resistor—100,000 ohms—Carbon type—½ watt—Pkg. of 5.	1.00
3459	Capacitor—80 mmfd.	.44
3460	Capacitor—1,200 mmfd.	.30
3526	Resistor—2,000 ohms—Carbon type—½ watt—Pkg. of 5.	1.00
3536	Capacitor—Filter capacitor—Two 5.0 mfd.	1.10
3555	Capacitor—0.1 mfd.—R. F. and I. F. Bias	.36
3572	Socket—7 contact Radiotron socket—Oscillator	.38
3584	Ring—Antenna, R. F. and oscillator coil retaining ring—Package of 5	.40
3592	Knob—Station selector, volume control, or radio-phonograph knob—Package of 5	.80
3602	Resistor—60,000 ohms—Carbon type—¼ watt—Pkg. of 5.	1.00
3615	Knob—Range switch or tone control knob—Package of 5.	.60
3616	Capacitor—300 mmfd.	.34
3622	Shield—Radiotron shield—Second detector	.36
3624	Socket—Station selector or volume control lamp socket and bracket assembly	.40
3630	Resistor—10,000 ohms—Carbon type—3 watt	.25
3634	Capacitor—160 mmfd.	.34
3640	Capacitor—0.05 mfd.	.25
3641	Capacitor—0.1 mfd.	.35
3682	Shield—Radiotron shield—Oscillator and 1st dectector	.22
3719	Socket—7 contact Radiotron socket	.30
3760	Switch—Radio-phonograph—Rotary type—Double pole—Double throw	.98
3761	Scale—Volume control dial and scale assembly	.60
3762	Screw—Chassis mounting screw and washer—Pkg. of 10	.32
3765	Capacitor—0.025 mfd.	.34
3766	Extension—Tone control, rotary switch, volume control, or range switch shaft extension	.36
3767	Extension—Station selector shaft extension	.36
3768	Screw—Set screw for shaft extension coupling—Pkg. of 10.	.35
3769	Resistor—750 ohms—Carbon type—½ watt—Package of 5.	1.00
3770	Resistor—50 ohms—Wire wound—Porcelain type	.34
3771	Resistor—8,500 ohms—Carbon type—3 watt	.25
3772	Capacitor—0.5 mfd.	.32
3783	Capacitor—9 mmfd.—Package of 2	.50
3784	Capacitor—900 mmfd.	.30
3787	Capacitor—0.01 mfd.	.30
3788	Coil—High frequency compensator choke coil	1.00
3942	Shield—Radiotron shield—Oscillator and 1st detector	.18
6188	Resistor—2 megohm—Carbon type—½ watt— Pkg. of 5.	1.00
6279	Resistor—15,000 ohms—Carbon type—½ watt—Pkg. of 5.	1.00
6282	Resistor—60,000 ohms—Carbon type—½ watt—Pkg. of 5.	1.00
6300	Socket—4 contact Radiotron socket	.35
6303	Resistor—20,000 ohms—Carbon type—½ watt—Pkg. of 5.	1.00
6471	Coil—Oscillator coil	.74
6485	Volume control with mounting nut	1.20
6527	Coil—Antenna coil	1.08
6528	Coil—R. F. coil	.94
6534	Switch—Range switch	1.25
6551	Transformer—Driver transformer	1.48
6552	Reactor—Filter reactor	1.04
6553	Transformer—First intermediate frequency transformer	1.56
6554	Transformer—Second intermediate frequency transformer.	1.64
6555	Capacitor assembly—Comprising one 10.0 mfd. and one 4.0 mfd. capacitors	1.64
6557	Scale—Dial and dial scale—Tuning capacitor	.78
6559	Tone control complete with mounting nut	1.60
6648	Capacitor—0.25 mfd.	.42
6674	Output Filter—Comprising reactor and capacitor	1.60
7062	Capacitor—Adjustable trimming capacitor	.50
7484	Socket—5 contact Radiotron socket	.35
7485	Socket—6 contact Radiotron socket	.40
7487	Seield—Radiotron shiel—R. F. and I. F.	.25
7588	Condenser—3 gang variable tuning condenser	2.85
7590	Capacitor—10.0 mfd.	1.40
9026	Transformer—Power transformer 105–125 volt—50–60 cycle.	4.80
9035	Transformer—Power transformer 105–125 volt—25–40 cycle.	6.00
	MISCELLANEOUS	
3759	Receptacle—Needle receptacle with mounting screws	.50
3763	Suspension spring, washer and bolt assembly for motor board—Comprising one bolt, two cup washers, 2 springs, one "C" washer, and one cap nut	.42
3764	Nut—Cap nut for motor board suspension assembly—Package of 4	.40
6288	Knob—Phonograph volume control knob—Package of 5	1.00
6560	Volume control—Phonograph volume control	1.60
6576	Cable—Shielded two conductor cable from phonograph volume control to transformer pack	.32
6646	Socket and base assembly—For compartment lamp	.60
6647	Shade—Compartment lamp shade	.30
6649	Escutcheon—Station selector—Package of 2	.44
6650	Escutcheon—Volume control—Package of 2	.44
7632	Transformer pack—Comprising input transformer, two reactors, one 2,400 mmfd., one 300 mmfd., one 0.02 mfd. capacitors, one 200,000 ohm and one 15,000 ohm resistor—In metal container	5.45
10241	Box—Needle box with lid—Package of 2	.60
	REPRODUCER ASSEMBLIES	
6184	Board—Terminal board complete with three terminals—Package of 5	.50
6556	Transformer—Output transformer	1.50
8969	Cone—Reproducer cone—Package of 5	6.35
9434	Coil assembly—Comprising field coil, magnet and cone support	4.66

Stock No.	DESCRIPTION	List Price
	AUTOMATIC RECORD CHANGER EJECT ARM ASSEMBLIES	
2917	Washer—Spring washer—Package of 10	$0.25
3655	Retainer—Ball retainer with three ball bearings	.45
3656	Bearing—Ejector tip bearing	.48
3657	Tip—Ejector tip	.30
3658	Ball—Ball bearing—Package of 20	.30
3660	Shaft—Eject arm shaft	.40
3661	Yoke—Eject arm yoke assembly	.80
3662	Plate—Ejector plate and felt pad—Package of 5	.95
3663	Spring—Eject arm horizontal action tension spring—Package of 10	.50
3665	Screw—Eject arm adjustment screw and nut—Package of 5.	.25
3729	Roller—Counter balance roller—Located inisde of eject arm.	.45
3930	Cushion—Counter balance roller stop cushion and bracket—Located inside of eject arm	.18
6575	Cover—Eject arm cover	.90
7605	Arm—Eject arm assembly complete	4.30
	MOTOR ASSEMBLIES	
9011	Motor—Motor complete 105–125 volts—60 cycles	19.72
9012	Motor—Motor complete 105–125 volts—25 cycles	24.16
9013	Motor—Motor complete 105–125 volts—40 cycles	24.16
9014	Motor—Motor complete 105–125 volts—50 cycles	19.72
9015	Rotor and shaft for 60 cycle motor	7.00
9017	Rotor and shaft for 25 cycle motor	9.00
9019	Rotor and shaft for 40 cycle motor	9.00
9021	Rotor and shaft for 50 cycle motor	7.00
	MOTOR BOARD ASSEMBLIES	
2893	Spring—Trip lever tension spring—Package of 10	.30
2897	Screw—Cable lever tension spring adjustment screw and nut—Package of 5	.50
3322	Switch—Motor switch complete	.75
3653	Spring—Phosphor bronze—Trip pawl spring—Package of 5.	.30
3654	Roller—Guide roller assembly—Comprising bracket, roller, and guide pin	.34
3666	Spring—Cable lever tension spring—Package of 10	.44
3667	Plate—Actuating plate assembly	.42
3669	Screw—Special screw for holding main lever to actuating plate—Package of 5	.25
3670	Finger—Friction finger assembly	.32
3671	Lever—Manual index lever	.45
3672	Pin—Manual index lever pin	.42
3673	Screw—Manual index lever adjustment screw and nut—Package of 5	.20
3674	Escutcheon—Engraved MANUAL 12-10	.32
3675	Lever—Trip lever assembly	.90
3676	Spring—Cam and gear tension spring—Package of 10	.52
3677	Lever—Cable lever assembly	.40
3777	Motor mounting spring, washer, and stud assembly—Comprising three upper and three lower springs, six cup washers, three spring washers, and three studs—Package of 1 set	.62
3778	Spring—Main lever and link assembly tension spring—Package of 10	.55
6502	Cam and gear assembly	1.18
6503	Pawl—Trip pawl assembly	.40
6504	Lever—Main lever and link assembly	.80
10174	Springs—Automatic brake springs—One set of four springs—Package of 2 sets of 4	.50
10184	Plate—Automatic brake latch plate—Package of 5	.40
	PICKUP AND PICKUP ARM ASSEMBLIES	
3388	Screw—Pickup needle holding screw—Package of 10	.60
3417	Armature—Pickup armature	.72
3419	Screw—Pickup cover mounting screw—Package of 10	.40
3516	Damper and bushing assembly—Located at bottom of pickup arm base—Package of 1 set	.14
3680	Rest—Pickup rest	.18
3728	Coil—Pickup coil	.50
3732	Cover—Pickup cover	.50
3733	Back—Pickup housing back	.60
3734	Cover—Pickup back cover	.30
3735	Screw assembly—Pickup mounting screw assembly comprising one screw, one nut, and one washer—Package of 10	.60
3736	Rod—Automatic brake trip rod with lock nut—Pkg. of 5.	.30
3737	Damper—Package of 5	.65
3779	Escutcheon—Pickup arm escutcheon complete with mounting rivets	.46
6542	Pickup—Pickup unit complete	4.15
6543	Arm—Pickup arm complete less escutcheon, pickup, pickup mounting screw, nut, and washer	4.00
	TURNTABLE ASSEMBLIES	
3338	Ring—Clamp ring assembly—Comprising spring, latch lever, and stud	.50
3340	Washer—Thrust washer—Package of 2	.56
3341	Pin—Groove-Pin—Package of 2	.56
3342	Spring—Latch spring—Located on clamping ring—Package of 2	.56
3344	Cover—Grease retainer cover—Package of 2	.70
3346	Bushing—Speed shifter lever bushing—Package of 4	.66
3347	Spring—Speed shifter lever spring—Package of 2	.30
3678	Sleeve—Sleeve complete with ball race	2.24
3679	Lever—Speed shifter lever with mounting screws	.50
9010	Turntable—Complete	5.50

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PL 9

RCA Victor Company, Inc.
Camden, N. J., U. S. A.

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RCA
"HIS MASTER'S VOICE"